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Will Try for Reduction of Inventories and Elimination of Duplicate Stocks

The cooperation of all manufacturers using steel is being sought by the WPB, to cut inventories and gain 2,000,000 tons of steel. Working through its 12 Regional Offices, Steel Division officials have been sent by the Washington Office to work with consumers, in an effort to see if steel supplies on hand will permit the elimination or deferment of third and fourth quarter orders on producers' books without interfering with the production of important war equipment.

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FORGOTTEN PEOPLE

THE "forgotten man" lately has been somewhat neglected. During the hard times he was the subject of considerable political comment. Much was said about him, although less was done about him until Mars took him over and put him to work at good wages.

This original forgotten man was the fellow who couldn't get work because there were not enough jobs to go around during the depression years. Whoever or whatever was responsible for this lack of jobs has not yet been determined and perhaps never will be. But very rightly Government undertook to help out these unfortunates and did, although some of the methods employed may have been open to criticism.

We shall always have forgotten people with us, even during periods of so-called prosperity, such as the present. And it will be a duty of Government to assist them when they cannot help themselves.

Today, the forgotten people are even more numerous than they were in 1930 to 1933. But they are not the same kind of people. The forgotten ones of today are the white collar workers and the retired people who live on fixed incomes.

There is very little that Government can do for the latter of these two groups except to prevent inflation stealing in through their windows and robbing them of part of their capital. I think that Government is really trying to prevent this, although the record has not been altogether successful.

With respect to our white collar workers, I think the Government is not only not helping them, but that it is hurting them. Certainly it is not giving them the consideration that it gives to the men and women wage earners in our factories.

Many progressive managements would like to help their white collar workers keep their heads above water in the rising tide of living costs. They know that, despite the fact that "Rosie the Riveter" and "Willie the Welder" are doing a fine job of war production in the plants, there would not be any production at all if it were not for the ideas, knowledge and leadership displayed by their foremen, engineers, production experts, metallurgists and office people who are on fixed weekly salaries regardless of the hours that they work. In many instances, these people put in just as many hours per week as do the hourly paid workers, yet in spite of supposedly superior qualifications, draw less money.

Progressive management would be only too glad to correct these injustices, but finds its hands pretty well tied by Government administrative restrictions.

These skilled and experienced people are not unionized and have no collective political voice. But they are the very yeast of the home front war effort. Their ideas, knowledge and initiative furnish the larger part of the push of the war effort.

Unless something is done to help them meet the squeeze, many of them will be tempted to swap their white collars for overalls, so that they can take home as much money as do our semi-skilled shop workers and the 'teen age industrial newcomers. And then we would certainly find ourselves out of luck.

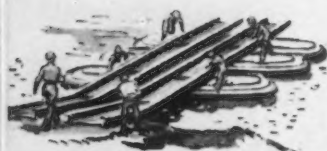
J. H. Van Deventer



Inland sheets are used in
fighter aerial bombs . . .



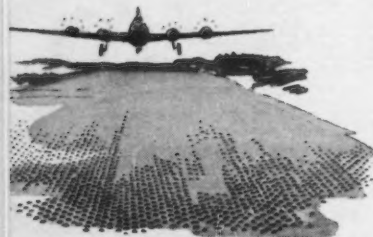
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planes launch their attacks . .



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the lifelines of Armies in action.

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War products made of Inland sheets have been moving to the four corners of the earth—to Arctic Regions and blazing deserts, to remote continents and islands. Fighter squadrons take off from landing mats of Inland steel. Troops are fed, bombers and mobile units are fueled, and explosives and ammunition are safely stored in containers made of Inland sheets.

Yes, wherever you find men fighting for Democracy, you will find products made of Inland sheets.



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● A secretive and highly efficient manufacturing operation is the use of 500,000 amp. at 12-15 volts to flash weld trench mortar and artillery shells (not cases). Two halves are pressed from plate, and the welding area often exceeds 20 sq. in. Production has run into millions.

● Airplane engine manufacturers are now going into production on a 3350 cu. in. displacement motor, an 18-cylinder job developing 2200-plus h.p. How much plus has to await the capture by the Germans of an intact engine.

● OPA is processing Kaiser's petition for establishment of West Coast base prices on semi-finished steel. Ingots may be set as high as \$40 a gross ton, against \$31 now ruling at Chicago, Pittsburgh, etc.

● Lend-Lease is talking with some American suppliers about building and setting up an electrolytic tinning line in Argentina. Probably the plan, basically a little silly in view of the lack of continuous coils of steel, will die a quick death.

● Speaking of South America, American exporters looking for a post war market there will be delighted to learn that Rio de Janiero has just raised minimum wages 45c. a month to \$15.45.

● All the government's metal recovery corporations (steel, copper, aluminum) will soon go out the window.

● Time Magazine last week lauded Kaiser's first small (merchant ship hull) aircraft carrier, as a unique idea he personally rammed down the Navy's throat with Presidential backing. Forgotten was H.M.S. Battler, first of a number of merchant ship hulls converted to "escort carriers" (Woolworth carriers) which Ingalls completed for the British over a year ago, and which Churchill credited with the recent drop in Atlantic submarine sinkings.

● The German Iron and Steel Institute, meeting recently, concluded that the basic bessemer converter would almost fully replace the open hearth in the post-war period.

● Belly turrets on bombers will soon be passe. In future, belly gunners will be inside the ships with remote controls and sights, while guns with range superior to the old turret guns will hang from brackets below the ship's belly.

● Vast numbers of minute but true welds, constantly being made and broken, are major cause of bearing friction and result in more harm than all other wear causes combined, recent studies indicate. German investigators are on the same track, agreeing also that destructive contact follows impairment of oxide film.

● Exhortations to South America to industrialize are bearing fruit. In Sao Paulo, Brazil, alone there are ten concerns making imitations of a certain well known American lathe.

● Representatives of some large coal mine operators met with a couple of Ickes' boys in Pittsburgh last Thursday to explore just what is meant by the Federalization of coal mines that has been proposed by Lewis; i.e. does the Government pay the taxes, take care of depreciation, is there any profit for the companies involved, ad infinitum.

● Renegotiation has been going on for 100 years under the name of piece work price cutting, with industry at the other end of the renegotiation, J. F. Lincoln, president of Lincoln Electric Co., told the House Naval Affairs Committee recently. He called it greatest error management ever made.

● The Pacific Northwest will shiver on the verge of a power shortage by autumn of 1944, according to Bonneville Power Administration, which advocates a third giant dam in the Columbia Basin and additional storage dams for Grand Coulee and Bonneville.

● Fuse production can now be controlled 100 per cent with a new device developed by Willys-Overland Motors for testing fuses in anti-aircraft shells. The action of the shell in flight is simulated by a spinning process.

● Manhours required for a standard liberty ship have been reduced by West Coast yards below 250,000 per vessel, less than half of the bogey 510,000 on which contracts were originally based. One of the best man-hour records belongs to Kaiser Portland yard where ratio of women workers is also highest in the country.

● Because of better-than-expected production, one large explosives plant has been completely shut down and others are curtailing output drastically.

Bearing and Tool Damage

THE writer has previously presented some ideas regarding the causes of bearing surface damage together with some suggested remedies.* The serious effects of welding, perhaps more commonly called "galling," likewise have previously been stressed. Continued careful ex-

* See the article, "How Smooth Should a Bearing Surface Be," in THE IRON AGE, issue of Jan. 8, 1942, p. 40.

amination of damaged plain bearing surfaces has reinforced the belief that such welding is a far greater source of detrimental bearing conditions than is commonly supposed. Indeed, it is believed that practically all metal surfaces that rub together are harmed more by welding than by all other causes combined.

Of course, welding is not the only source of damage to bearing and tool surfaces. Undoubtedly, turned and ground surfaces are covered with partially loosened minute splinters of metal produced by the tearing and splitting action in the removal of chips by a lathe tool, or by the ineffective cutting angles of grinding grits. Such splinters are completely freed during the early part of operation to become loose abrasive particles. Some of them are gradually washed out of the bearing causing a certain amount of erosion as they pass between the surfaces, and some may become more or less deeply fixed in the softer of the two surfaces.

Where a soft bearing metal such as babbitt is employed, the particles may become almost completely embedded with only their tips projecting. In this case they usually cause an improvement in the shaft smoothness by a mild abrasive action. They will burnish the shaft surface to a better operating finish condition. When a harder bearing metal, such as bronze, is used, the particles seldom become so deeply embedded. Instead, they may be fixed just deeply enough to hold them in place, when they have little tendency to produce smoothness. More often, rather deep scoring is the result.

Roughness, such as turning or grinding ridges, undoubtedly has some cutting action on the mating surface, especially during the early stages of operation. Until the ragged, splintery

portion of the ridge tips has been removed, this cutting may be somewhat important. Yet experience has shown that this effect soon dies down because the tips rapidly become dull.

Such are the processes of wear usually described as contributing to the most damage of bearing and tool surfaces. Under comparatively mild operating conditions, where metal to metal contact might better be described as approximate rather than actual, that may be the true picture. Yet, except where particles become wedged between the surfaces so as to cause scoring, it should be noted that the general tendency of these kinds of wear is to produce increased smoothness and better geometry of the surface. Any burnishing action or wear resulting from interlocking of irregularities cannot help but reduce high spots first, and thus result in increased roundness and smoothness. Unless there be other actions than these, the greatest detrimental result of roughness would seem to be increased and uncontrollable clearance dimensions.

Unfortunately, it is known from experience that other damaging processes must be in effect, because bearings very often do not improve in smoothness with continued operation. All of the evidence that the writer has seen indicates very definitely that the chief cause of increased roughness is welding or "galling."

In the previous article* three conditions were described as necessary for welding to occur. First, the materials employed must have some degree of affinity for each other. Second, the surfaces must become absolutely clean. Third, the surfaces must come into close enough contact that they are within the field of molecular attraction. Heat is not at all necessary for welding to occur, although it is always present to some degree, and does greatly increase the amount of damage done.

All metals employed for tool and bearing purposes do have sufficient affinity for one another to weld, but they vary considerably in the degree of that affinity. Minute areas are very often wiped clean enough, and into sufficiently close contact, particularly during a state of boundary (deficient) lubrication. When the required close and clean metallic con-

tact does occur, just as true a weld takes place as that produced by an oxy-acetylene torch. It is unlikely that it is as perfect, because a liquid metal would make a more continuous contact, and flux would cause a more perfect cleanliness of surface. Nevertheless, galling is a sufficiently perfect welding action to cause a great deal of damage.

Welds Are Very Small

To most mechanics the word "galling" instantly brings to mind a comparatively large surface defect; one that is easily seen, and which may even stop the motion. However, the vast majority of welds are very minute in size and instantly break apart with no perceptible effect on the rotation of a bearing or movement of tool parts. (See Fig. 1) The energy consumed in the making and breaking of these welds is undoubtedly an important part of the total effect called "friction" and contributes to the heat developed thereby. The ultimate load carrying capacity of a bearing is its ability to resist serious galling. Because it is most often microscopic in extent, the restriction in bearing capacity by galling is easily overlooked. Just because the results of this action cannot always be seen easily does not prove them to be unimportant.

Galling is a three dimensional action; it involves both area and depth. The area of the weld will depend upon the contour of the surface and upon the softness of the metal. If the roughness of the surface is sharp, the area will be small; but if it be soft enough to deform under the applied pressure, the area will become correspondingly larger. Other conditions being the same, a combination of metals of low affinity for one another will result in fewer and smaller spots of welding, and this is the most important reason for the continual search for improved bearing metals and alloys.

The depth to which particles are torn out, as welds break apart, is dependent upon the softness and ductility of the metal. Very hard and brittle surfaces will not deform to allow a large area of contact and will flake off in very thin particles. Soft and ductile metals will tear out

ge by Galling

By E. L. HEMINGWAY

Chief Metallurgist, International Machine
Tool Corp., Foster Division,
Elkhart, Ind.

to a considerable depth. In either case, the metal torn from one surface becomes a ragged defect welded upon the other.

It is, however, very important to note the difference in the extent of damage done to the mating surface by a weld torn from a hard and from a soft metal. The weld of comparatively large area, and very much greater depth, torn from a ductile metal will obviously produce much more extensive damage. It will surely score the mating surface to some extent before becoming broken loose or worn off. Too often it will pile up metal ahead of it to the point where further movement is stopped, and mechanics say it has "frozen." Most of the shaft and tool scoring, usually ascribed to the presence of foreign particles, is caused by this process.

The thin flakes of smaller area, torn from a hard or brittle surface, will naturally have the same tendency, but the extent of damage will be very greatly reduced. In the first place, the hard welds will be rubbing against the hard metal from which they were torn, with small probability

... Welding is a far greater source of detrimental bearing conditions than is commonly supposed. The author examines the reasons and theory of galling, and gives pertinent data on how this action can be minimized. Bearing metals, and other important data on bearing performance also are discussed herein.

of scratching deeply because of that hardness and their extreme thinness. Any metal removed by the weld from the hard parent surface will be finely divided, and will not pile up to any extent ahead of the weld. The very minute welds from a hard metal tend to ride over the parent surface instead of gouging into it as is the case with soft metals. There is no reason to believe that hard steel surfaces will weld less readily than soft ones, but those welds will be very much smaller, both in area and depth, with comparatively very little damage done; and herein lies the chief reason for the better performance of hard steel shafts as compared to soft ones.

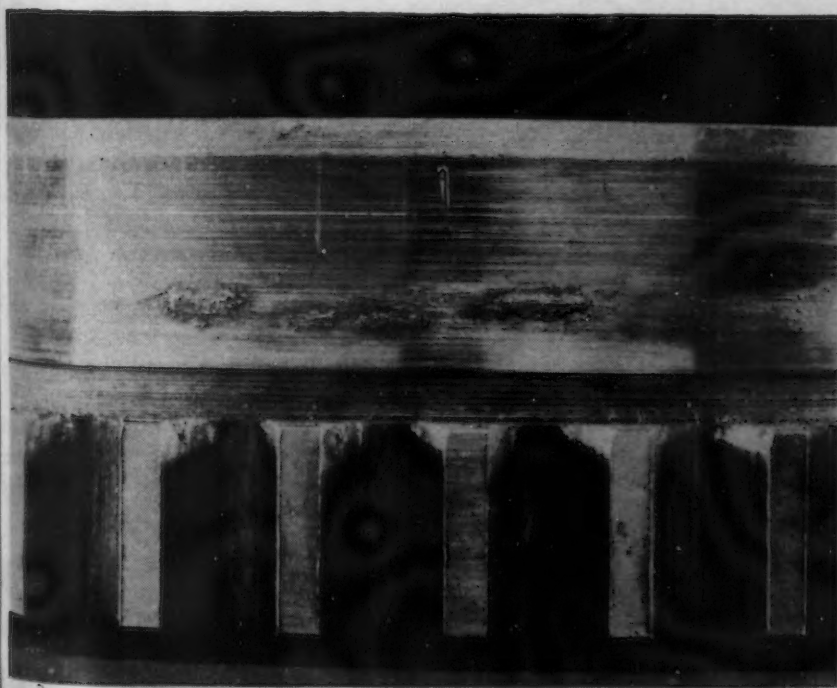
Frictional heat greatly increases

the amount of damage by galling. It expands the affected area, forcing it into still greater pressure and rise in temperature. It promotes greater cleanliness by frying away the oil. Worst of all, it considerably increases the softness and ductility of the metals with the detrimental results just described. If heat is allowed to develop through inadequate lubrication, or other causes, the possibilities for serious damage are enormously increased.

Grinding is an exceedingly valuable process for the production of dimensions sufficiently accurate for practically all purposes except such tools as gages. Indeed, modern mechanical efficiency can be said to date from the development of the production grinder and synthetic abrasives. Nevertheless, there are features of ground finishes which are very undesirable in bearing and tool surfaces. (See Fig. 2) The pattern of a ground surface consists of a helix winding around a cylindrical part composed of a succession of ridges several times as long as their widths. This helix is plainly visible, and everyone is familiar with its appearance. In addition to these spiral semi-continuous ridges, all ground surfaces contain some degree of longer pitch waviness, which seldom can be seen, and which is not revealed by the Profilometer or Brush Analyzer. They are caused by mechanical defects of the grinder, by the heat produced in grinding, and perhaps still other causes. For example: a loose spindle will produce "flats"; a slight looseness in the head stock will cause a parallel chatter, particularly with certain types of drive; lack of sufficiently rapid cooling by the grinding solution will result in feed spirals. Apparently, no grinder will produce a perfect geometry of surface.

Another detrimental condition produced in grinding is annealing or

FIG. 1—Galled hub gear bearing. Both small welds (right), and those large enough to stop rotation (center), are shown. All of the scoring, across the entire width of the bearing, was caused by welding. Most galling is of still less extent.



"burning" of a hardened steel surface. Such annealing may include only the surfaces of the ridges, but somewhat deeper on the tips; or it may include the complete cross-section of the ridge and some depth into the body of the part. Unfortunately, such annealing causes the supposedly hard bearing or tool surface to resemble a soft surface in its performance. It may eventually wear down sufficiently to expose a real hardness, but considerable scoring will result before that condition is secured.

Oil Film Imperfect

Wear by galling of ground surfaces begins upon the tips of the highest ridges upon the crests of waviness. These few scattered ridges are the actual load carrying areas, and the only ones. It is important that this picture is visualized: That, unless the oil film pressure is sufficient to separate the surfaces completely, the entire bearing load is carried upon the peaks of the highest surface irregularities. In practice it is very seldom that the oil film will separate the surfaces at all times.

As these very small areas come into rubbing contact with the mating surface, they very often are wiped clean enough, and forced by pressure into close enough contact, for welding to take place. When the weld is broken apart, the height of the ridge from which it was torn is reduced by the amount of metal removed. Further, the weld particle will scratch or score more or less deeply the surface from which it was torn depending upon the hardnesses of the two surfaces. Metal is thus removed by a kind of machining action by the rough weld particles, and by welding

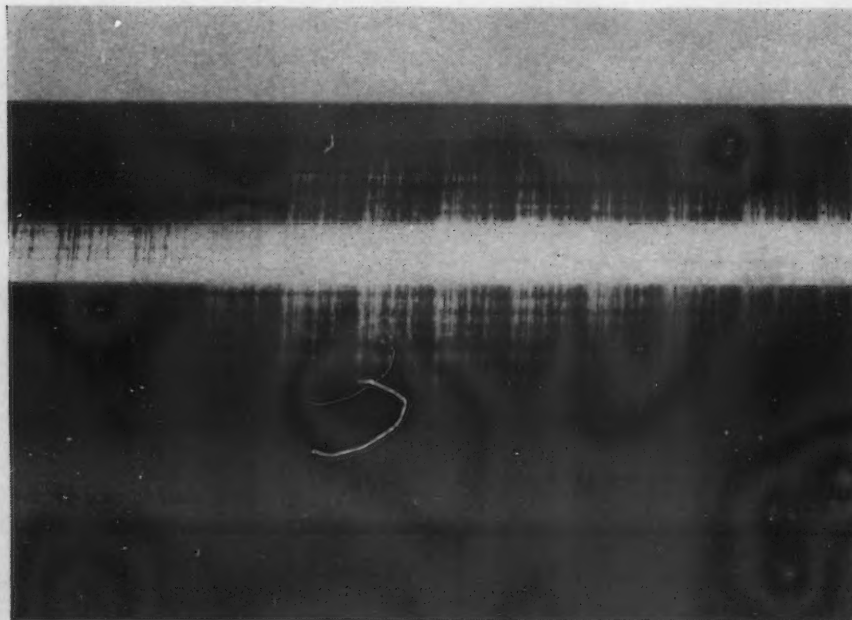
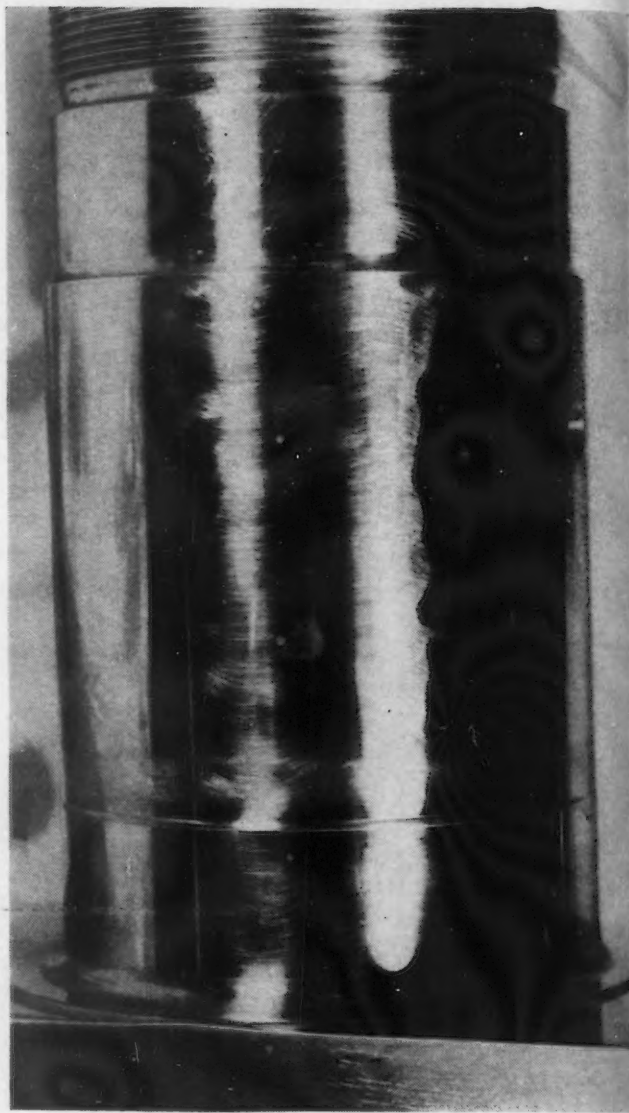
RIGHT

FIG. 3 — Sanded crank bearing. Aviation engine main bearing, which has been sanded, then partially Superfinished. Hollows, produced by sanding, have almost completely been removed.

o o o

BELOW

FIG. 2 — Grinding defects. A ground pilot bar is shown, the defects of which have been exposed by a very short application of a Superfinishing stone. Completion of the operation will remove these defects of surface geometry, together with fragmentation and annealing.



transfer from one surface to the other. Attrition of this sort continues, and first the highest ridges are removed exposing spots of continuous surface on the crests of waviness. Finally, even waviness itself may be eroded away by a multitude of separate galling and scoring actions.

Just as in abrasive wear by embedded particles in a very soft bearing surface, the general tendency of galling wear is to produce a better degree of roundness and a reduction of waviness. The welding begins its attack on the highest points of the surface. However, while abrasive wear will sometimes result in greater smoothness when the bearing metal is soft and has little affinity for the shaft metal, galling wear will almost invariably produce scored rings which are usually deeper than grinding ridges. This is particularly true if the shaft is soft or has been annealed by unskillful grinding to an unusual extent. Once visible scoring has started, all control over the

eventual quality of surface and clearance dimension has been lost.

Several abrasive processes are in use that are applied after the grinding operation to remove fragmentation and annealing and to produce greater smoothness. For these purposes, such processes as sanding have been reasonably successful, but they most often increase waviness beyond that produced by grinding. The writer has seen many parts finished by strip abrasives and has never yet seen one that did not have hollows developed in its surface by that process.

There can be little doubt but that smooth waviness is more difficult to force through an oil film, into metallic contact, than grinder ridges. Yet, if the smooth area does come into such contact under excessive pressure, the damage is very likely to be more extensive, simply because a larger, more continuous area is involved. The chances that a comparatively large weld will form are greater, and the broken weld particle will plough through a longer, continuous extent of area with no valleys to break up the continuity of scoring action. Considerable metal can thus be piled up ahead of the original weld.

Of course, the same line of reasoning applies in still greater degree to a smooth surface of perfect geometry or without waviness. However, as the perfection in surface shape becomes greater, the actual effective bearing area is also increased. The unit pressure becomes equalized all over the bearing area, and the probability of metallic contact under serious pressure becomes very much less. Another consideration is the fact that smooth and perfectly shaped surfaces can be fitted with the very minimum of clearance, thus avoiding shaft deflection within the bearing, with consequent localization of pressure at the ends of the bearing.

Other factors remaining the same, the smoother and more perfect in shape surfaces are made, the greater will be their load capacities as long as adequate lubrication is supplied, but the greater will be the damage when metal to metal contact does occur. Fortunately, there are means of compromise by which lubrication can be improved and galling decreased even during boundary conditions. Among the items that contribute in that direction and to more uniform distribution of bearing pressure are:

- (1) Use of bearing metals of low affinity for the shaft, which usually is steel.
- (2) Use of bearing metals containing contaminants.
- (3) Use of lubricants containing

elements which form surface films.

(4) Use of a second surface finishing operation after grinding that will produce the following effects:

(A) Improve the shape or geometry of the shaft or tool surface.

(B) Produce a pattern of minute oil grooves all over the shaft surface.

(C) Increase the actual load carrying area by production of finer and, therefore, greater number of surface ridges.

(D) Break up, minutely, the continuity of surface smoothness.

(E) Remove fragmentation of surface, smear metal, and annealing, all of which are produced by the heat

reasonable. Babbitt metal, as an example, does not bond readily and is widely known to have little tendency to score.

Others believe that those of similar crystalline lattice formation score readily, and those of considerable difference do not. Another (Underwood) thinks the position in Mendeleeff's periodic system has much to do with this probability. Whatever merit these theories may have, the writer believes the essential thing to recognize is that scoring originates in welding, and that such welding will be less serious if the shaft and bearing have low affinity for one another.

To investigate the conditions of wear of metallic surfaces under the action of sliding friction, and at different temperatures, W. Radeker used a special arrangement in which the test sample could be heated and cooled by extraneous means. In this work, which is described in the *Archiv für das Eisenhüttenwesen*, tests were conducted over a temperature range from -190 deg. to $+700$ deg. C.; the relative speeds of the surfaces in contact were 6 and 31 ft. per second. With the materials investigated, unalloyed steels with 0.04 to 0.73 per cent C, cast iron, non-rusting Cr and Cr-Ni steels, and manganese steel, the wear in most cases was found to diminish as the temperature was raised and then increased again beyond a certain critical temperature. Wear was of three types: (a) Flaking, (b) removal of surface layers, and (c) oxidic abrasion. Wear under (a) was very marked and due to direct contact between the metals; this effect could be considerably reduced by an increase in temperature; (b) only occurs when the outer layers of the materials in contact are at a high temperature, whether produced artificially or by actual friction; this type of wear is very pronounced as soon as the oxide surface is punctured or removed. With the oxide skin unimpaired the wear was very slight. The third type of wear is due to the simultaneous occurrence of high temperatures and slight deformation of the surfaces in sliding friction. There is, of course, a series of transition stages between these three types. The author found certain relationships between the temperature effect and amount of wear and the loads and the relative speeds of the surfaces in contact.

and the violence with which grinding grits remove metal.

It is outside the scope of this paper to discuss bearing metals at any length. Little more can be done than to point out the fact that considerable variation exists in the affinities of different metals and alloys for steel, which is almost universally used for shafts and tool parts. Where a bearing metal is used which has a low affinity for steel, it is entirely logical to expect that galling will correspondingly be reduced.

In the search for new bearing metals with lower scoring tendency, many theories have been advanced giving reasons for the variations to be expected in that respect. Some people, for instance, believe that the probabilities of scoring can be gaged by the ease with which the bearing metal can be bonded to a steel shell. As a practical test, this appears to be

Bronze bearing metal containing around 20 per cent of lead has very good anti-scoring properties. The lead does not alloy but properly exists as finely dispersed minute globules of the metal. The writer believes that when frictional heat is developed, the lead melts and is partially oxidized. The lead oxide is wiped between the bearing surfaces and acts as a contaminant, preventing true metallic contact and thus also eliminating welding and scoring.

Cast iron is a much better bearing metal than steel of the same combined carbon content, and this is due to its porosity. Sufficient oil (plus the possible effect of graphite) is contained in the graphitic areas to tide a bearing over a considerable period of excessive pressure. The very minute quantities of oil contained in the porosity of cast iron are sufficient to contaminate the surfaces and prevent

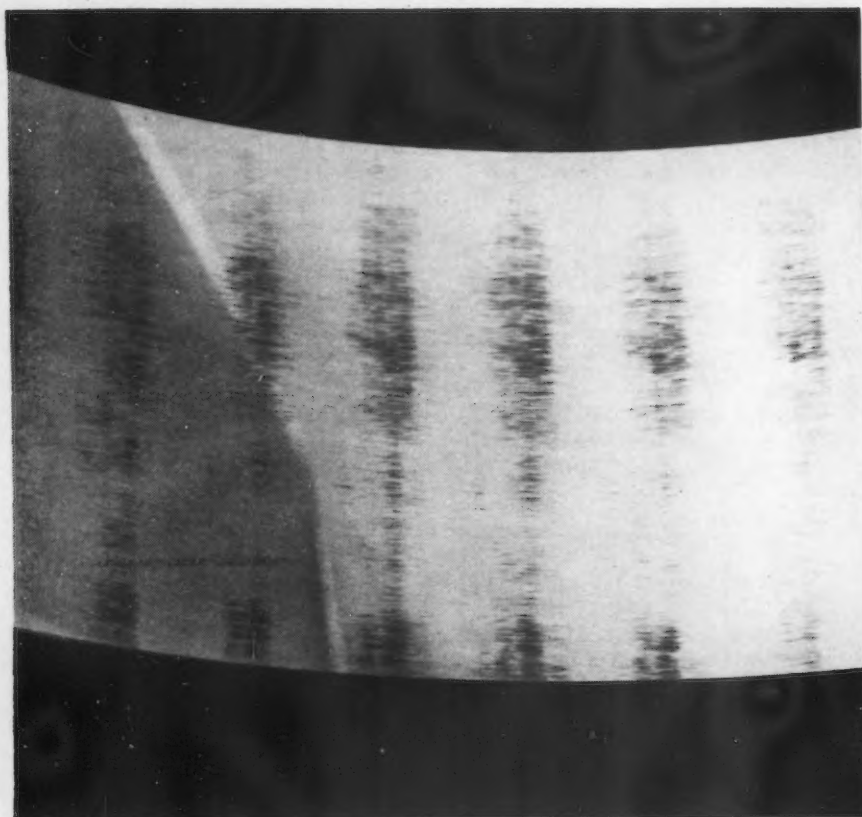


FIG. 4—Internal grinding defects. Shows ridges and chatter found in practically all ground holes. Surface has been incompletely Superfinished.

welding, often to an astonishing degree.

The writer conducted an extensive series of tests several years ago to determine the proper metals to use as seal surfaces operating under high pressure and considerable speed. A very large number of combinations of bronzes and steels were tried. Even high carbon, high chromium, high speed, and nitrided steels were entirely unsuccessful. Finally, cast iron was resorted to. Close grained and chilled iron were no better, but the most open grained iron available solved the problem. Where all other combinations had failed, two open grain iron surfaces running together actually were in better condition after 180 hr. of continuous operation.

Sprayed Metal Bearings

Another type of surface that has certain desirable qualifications is sprayed metal. While care must be exercised that it be deposited on the proper kind of roughness to hold it, because it does not actually bond to the surface upon which it is sprayed, it will operate with a minimum of welding. If a cross-section of sprayed steel be examined under the microscope, it will be found a structure of very minute droplets of steel surrounded by iron oxide. It is, there-

fore, weak and brittle and somewhat porous. However, the oxide is not only a polishing agent, but has no affinity for steel. Consequently, its tendency is to polish the mating surface and never to gall. The minute areas of exposed steel will tend to gall just as would any other steel, but any individual weld cannot progress very far because that action will be broken by the oxide film surrounding it. The porosity of sprayed metal undoubtedly acts similar to that of cast iron in holding the lubricant.

All bearing metals instantly begin to oxidize upon exposure to the air. If it were possible to maintain perfectly such oxide films during bearing operation, there could be no galling because oxides have no affinity for metals. They must be scraped off by the bearing motion for welding to occur. Experiments have been made where the lubricated bearing operated under a blanket of nitrogen and oxidation thus could not take place. Under that condition, it was found that galling was increased considerably because any protecting film of oxidation already formed was not replaced.

Thicker and thus considerably more permanent films can be secured by chemical action, either as a separate process or by an activated lubricant.

Instead of oxides, such films may be chlorides, sulphides or phosphides, etc. The result will be the same; they have no affinity for metals and thus prevent welding as long as they persist on the surface. Such production of surface films is sometimes employed to ease a bearing through the wearing-in period, particularly in those cases where heat or other causes have a tendency to produce an unpredictable alteration of the bearing shape.

While the "extreme pressure" or activated lubricants are sometimes resorted to in case of necessity, there can be no doubt but that attention to surface finish of shaft and tool surfaces offers the most hope of substantial improvement. Better surfaces, plus improved bearing metals, seem to be the aim of every manufacturer of precision mechanisms.

Since galling seems to be the most destructive kind of wear, it appears reasonable to consider very carefully how to distribute the bearing load uniformly over the greatest possible area and to lubricate and contaminate that area with oil in the most certain manner. Absence of areas of high unit pressure, together with efficient distribution of oil, should result in the minimum of metal to metal contact and the least damage when it does occur.

Uniform bearing pressure can be secured only by production of bearing surfaces of perfect geometry and amount of clearance. The yardstick by which the desirable accuracy of geometry and clearance should be measured is the dimension of the most efficient oil film, which is somewhat less than ten one-millionths of an inch. The perfect bearing assembly would have surfaces of perfect smoothness, with no deviations from perfect cylindrical planes in their shapes, and approximately 0.00001 in. clearance. It would never come to metallic contact.

At the present time, there appears to be no possibility that such perfection will ever be reached. No mechanical process can be visualized which will not result in some degree of waviness on bearing surfaces. Under boundary lubrication, there is certain to be some degree of metal to metal contact. All that can be hoped for is to minimize the results of such contact. As previously pointed out, the best way to do that is to make each point of contact subject to the least amount of pressure and render it as lacking in metallic cleanliness as possible by the best distribution of oil.

As the evidence accumulates from

many sources, it becomes reasonably clear that a system of minute oil grooving must be provided all over a heavily loaded shaft bearing surface. This is most easily done by the production of a very fine scratch pattern. These scratches must be very closely spaced because it appears that oil cannot be wiped over more than a very minutely short space of smooth area. The spacing of oil supply and actual bearing area should be exceedingly fine, preferably a surface with a Profilometer reading of no more than 5. Thus the chances of keeping the scratch tip contaminated are better; and, if they are not completely, the weld will be confined to an extremely small area.

The minute scratch pattern of tiny ridges and valleys is important for another reason. Not only is the weld confined to extreme smallness, but its further detrimental effects are thus restricted. If a weld occurs on a continuously smooth surface, it has much greater chance of piling up metal ahead of it, often many times the bulk of the torn out weld itself. If it occurs on the scratch pattern, it must pass over a broken surface and will soon be completely detached or will do no more than minutely scratch for a short time before it becomes worn down.

Of first degree importance is the geometrical accuracy of any bearing or tool surface. If the pressure is carried on the crests of waviness, the unit pressure on such points will be many times what it should be, with much greater probability of welding. (See Fig. 4) No matter whether the shape concerned be round or flat, everything humanly possible should be done to make that surface minutely perfect in its geometry. In bearing assemblies, it is fortunate that a proper shaft surface provides much the greater percentage of the improvement possible. This is because the bearing metal is usually much softer than the steel shaft, and the shaft surface largely determines the quality which the bearing will assume in operation. Nevertheless, the same attention to the bearing surface will produce still better results, oftentimes to a surprising degree.

The perfection secured in the shape of a shaft bearing has a direct relationship to the fineness desirable to the minute scratch pattern. It has been shown that welding on the tip of a minute ridge is seldom seriously damaging, particularly if it is truly hard. It is after the ridges have been completely eroded away and continuous spots of surface have developed on the crests of waviness, that

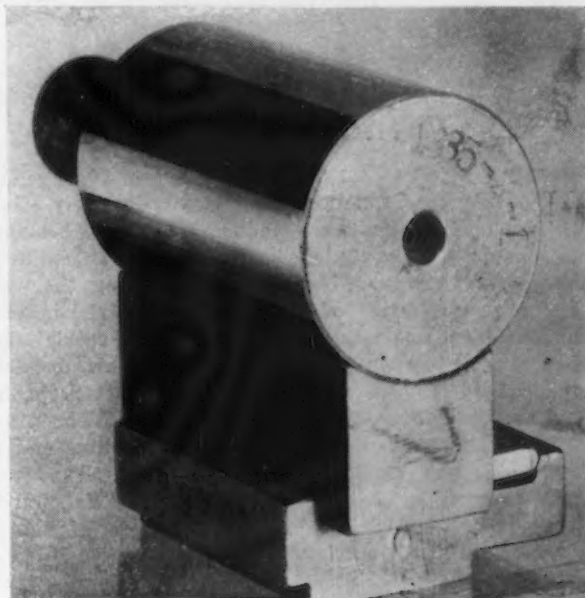
galling becomes really serious. Consequently, if the pattern of minute oil grooves is to be preserved after waviness has disappeared, they must be still deeper than the waviness. As the more minute the scratch pattern is the more efficient it becomes, this is another reason for improved geometry.

A last important point is the fact that the finest scratch pattern will result in the greatest total of actual load carrying area. Study of parallel scratch patterns has shown them to be similar in cross-sectional shape, no matter what abrasive process was employed. It is, therefore, reasonable to assume that the tip of each ridge has the same bearing area regardless

particles due to the violence of stock removal by grinding grits, can undo all the benefits derived from otherwise proper surface finish. Galling damage is immensely increased by the annealing produced by grinding.

In attempting to produce a surface of low Profilometer reading by grinding, there is always a tendency to produce "smear metal." The heat developed is sufficient to flow the roughing grinder ridges to fill in the valleys. The writer has recently seen several such instances in the surfaces of aviation instrument parts. While grinding is the most efficient means of producing accurate dimensions, it is far from suitable for production of final tool and bearing surfaces. An

FIG. 5 — Master-shaped abrasive. Shows Superfinished stud and stone used in that operation. Note the large area of contact, which makes possible the removal of chatter flats, ridges and feed marks. This extremely smooth finish is ideal for tools.



of the other dimensions. In other words, a fine ridge has the same load capacity as a large one, because the actual tips are all the same size and of approximately the same included angle. A surface having a great many fine ridges will thus have greater load capacity than one with fewer coarse ridges. However, here again the necessity for improved geometry appears. These ridges must be contained in the same plane if they are to be effective. Nevertheless, the advantage still lies with the finer ridge, even though some waviness does exist, because a lesser amount of metal would be removed by galling from a higher ridge before another came to its assistance.

The required pattern of minute oil grooving is possible to produce by grinding. However, as previously described, grinding also results in several effects that are very detrimental, indeed. Dirty oil, full of fragmented

additional, milder process seems necessary to produce the most desirable quality of surface for these purposes.

Experience has shown that the use of an abrasive process which applies many more finer grits over an area instead of a line contact, and with greatly reduced speed, is most efficient. Very much less work is thus done by each grit, resulting in practically no heat, annealing, or fragmentation. The stock removal should be only sufficient to remove these defects as produced by the previous grinding operation, usually one to two tenths of a thousandth.

The abrasive area, which is in contact with the work, must be a rigid master shape (See Fig. 5); and it must be large enough to cover sufficient surface to insure the removal of chatter, feed marks, flats and other waviness. The abrasive either should be applied loose on a metal master surface, or as a bonded master shape.

One applied on a line contact, or by means of emery cloth or sand paper, can never produce an improved geometry.

At the present time, there are two processes which can satisfy the described surface requirements regarding geometry and removal of annealing and fragmentation. They are metallic master laps and Superfinish. Careful lapping of this type produces a most excellent geometry, and a surface of the proper kind in every respect except scratch pattern. Scratches arranged in random directions are produced with comparative-

ly smooth and large areas between them. There is reason to believe that the oil contained in the scratches cannot sufficiently contaminate and thus prevent galling on the relatively large areas between them, under severe loading. The closely spaced scratch pattern previously described seems much more efficient in that respect.

Superfinish not only gives the necessary correction in geometry and removal of annealing and fragmentation, but can be controlled to produce almost perfect smoothness as well as the desired scratch pattern for shaft bearings. For many tool purposes, such as cartridge punches, piercing

punches and reamers, the surfaces cannot be too smooth. Superfinish is meeting these requirements better than any other process. Indeed, many people have come to believe that is the only type of surface for which Superfinish is useful. Such is not the case. When a scratch pattern for shaft bearings is deemed necessary, one of any desired Profilometer reading is easily secured by proper control, and use of the correct grain size of abrasive. Complete removal of waviness is also easily accomplished by the rigid, master shaped bonded abrasive used in Superfinish.

Induction Hardened Parts for Desert Warfare

U. S. Army Ordnance recognized publicly the part induction heat treatment has played in the manufacture of tanks, because of the resistance to wear of inductively hardened 26-in. bevel gear shafts and 30-in. drive sprockets used in English tanks of the Eighth Army in North Africa. These two large components of the drive mechanism are, according to reports, lasting three times longer. Further, they have been inductively hardened in this country 75 per cent under former costs.

This was revealed by G. E. Miller, chief engineer of the Buckeye Traction Ditcher Co., Findlay, Ohio, which is using regular Tocco process induction equipment developed for this ordnance job by Ohio Crankshaft Co., Cleveland.

In the use of the induction process to harden these pieces, distortion and the subsequent straightening operations once required on the gear shafts are eliminated. After hardening, only a finish grind is necessary. This removed a production bottleneck growing out of the extra handling formerly required. It has meant that skilled workers could be released to other jobs. It is said that heat treating costs dropped 75 per cent, while reports reveal that the life of these pieces is three times greater.

Example of how large parts are now being treated on these small hardening machines, the gear shaft has an overall length of 26 in. and a maximum diameter of 2½ in. It is of SAE 4820 carburized steel. Three areas on the shaft are hardened in-

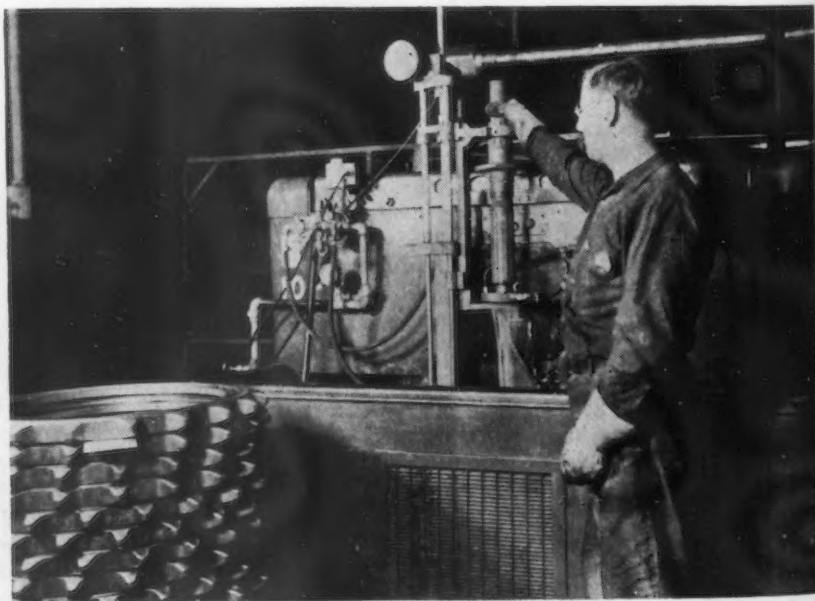
ductively—the spline section and two needle bearing races.

The spline area extends for 8 in. along the shaft with a diameter of 1 15/16 in. Hardening is continuous. A special hydraulic fixture on a 40-kw. one-station machine, holds the shaft perpendicular above the inductor. The piece passes downward for heating and water quenching in 66 sec. Hardness of 59 to 61 Rockwell "C" is obtained. Located on either side of the spline are two 1½-in.

roller bearing races, each inductively hardened to 59 to 61 Rockwell "C" in separate operations. The depth of hardness is ¼ in. Uniformity marks all treated areas and heat-treat rejects are negligible.

In addition to the 30-in. transmission sprocket which is of 1045 steel plate, a 27½-in. sprocket is also Tocco hardened. It is of SAE 1045 drop-forged steel 1¾ in. thick. The larger sprocket is ¾ in. thick. Each sprocket contains 20 teeth.

OPERATOR positioning a 26-in. bevel gear shaft in the inductor to be hardened. This gear shaft is part of a tank transmission mechanism. The spline section, 8 in. in length, is hardened in 66 sec. to 59-61 Rc. In the left hand corner are drive sprockets also Tocco treated.



Ford Reclaims Tungsten Carbide Chips

TUNGSTEN is one of the strategic metals, being produced chiefly from ores imported from China, and since tremendous quantities of it are used for cutting tools and other purposes, it is very essential that all scrap be reclaimed. The process described is now being used in the Aircraft Engine Division of Ford Motor Co. to recover or reclaim tungsten carbide tool tips that have chipped so badly as to be non-usable by regrinding.

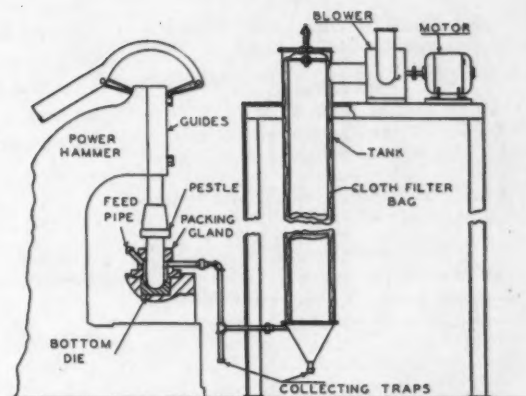
The first step is the removal of the carbide tip from its steel shank. This is accomplished by keeping the tool for 1 hr. in a concentrated bath of nitric acid at a temperature of about 150 deg. F. It is then removed from the acid bath and washed in water, and a slight tap then will loosen the carbide chip. The chips usually are slightly contaminated with iron and brazing material, which are readily removed in a bath composed of equal parts of nitric acid, hydrochloric acid and water.

Next the chips are washed in a bath of ammonium hydroxide, after which they are tumbled in a ball mill to clean them. Titanium and tantalum carbide chips must be removed since they are not recoverable by the present method of resintering. This is accomplished by passing the chips through a hydrogen-atmosphere furnace at 1650 deg. F., in which the titanium and tantalum carbide chips acquire a brownish color, while the tungsten carbide tips retain their light gray color, so that the former can be readily recognized and separated out. While still in the hydrogen atmosphere, the chips are pushed into a cooling zone for 2 to 3 min. where the temperature is allowed to drop to about 1000 deg. This limits the amount of oxidation that might take place upon withdrawal.

After visual grading and separation the chips are passed through a modified mercury flotation process in order to assure final separation of the titanium and tantalum grades which are lighter than the tungsten grades and float on the mercury.

The carbide chips are next pulverized in a 100-lb. Bradley power hammer, which operates at approximately 250 strokes per min. A hardened steel mortar and a pestle are used on this hammer. The pestle reciprocates through a packing gland that prevents the escape of carbide

MODIFICATION of Bradley hammer for pulverizing the carbide chips in a steel mortar and pestle. The packing gland is required to keep the dust from escaping.



dust. (See illustration). The carbide is fed into the mortar through an iron standpipe, and the pulverized product is drawn off by the air current of a centrifugal exhauster, through a cloth filter. The dust settles in a trap from which it is recovered.

The pulverized tungsten carbide is now put into carbon boats and placed in a hydrogen-atmosphere furnace at 1500 deg. for 20 min. to reduce any oxides that may be present. The powder is then put through a 400-mesh sieve, and the portion that passes through is ready for further use. The part that does not pass through is fed back into the power hammer and repulverized. A binder consisting of a 3½-per cent solution paraffin wax in trichlorethylene is added to the powdered carbide, and this mixture is dried in an oven at 140 deg. for approximately 2 hr.

It is now ready for forming into shapes. From this point on, the process is similar to that used in the manufacture of new carbide tips from powder. The mixture is com-

pressed in suitable steel molds under a pressure of from 5 to 20 tons per gives a somewhat higher density, it also tends to cause laminations, and for that reason it is necessary to use the lower pressure range in most cases.

The tungsten carbide thus compressed is placed in carbon boats and covered with aluminum oxide. After careful preheating to drive off the wax, it is "soft-sintered" at 1600 deg. for 20 min. After this soft-sintering process the carbide is "chalk-like" and may be cut to any shape with a saw, file or grinding wheel. The stock is cut to 17 per cent oversize in all directions, to allow for the shrinkage which occurs in the final sintering operation. This final sintering is done in carbon boats, in which the carbide shapes are covered with flake graphite and passed through a hydrogen-atmosphere furnace at 2760 deg. for 20 min. The tungsten carbide shapes are now ready for brazing to tool shanks, into die holders, etc.

Infra-Red Used to Skin Dry Sand Molds

A PORTABLE infra-red skin drier which will dry green sand molds quickly, uniformly and economically has been developed by Infra-Red Engineers, Inc., 812 Huron Road, Cleveland. These units will handle molds of any volume up to 46 in. long, 36 in. wide and 36 in. high. Time required to skin dry a mold 21 x 11 in. to a depth of 1½ in. is said to be about 90 min. and requires 1½ kw. of electric energy. Nine kw. and the same time will skin dry a

mold 46 x 36 in. The heater weighs 180 lb. and may be lowered or raised to accommodate molds of heights up to 36 in. A unit consists of six sections, each individually controlled by circuit-breaker type switches which permits drying small areas without heating the entire unit. Each heater unit contains 24 250 watt R-40 type lamps. Advantages of this unit is said to include absence of costly warm-up period, no wastage of labor, time or electricity, portability, flexibility and economy.

Tool Tipping Procedures for

BRAZING

LOW TEMPERATURE

APPARATUS

Oxyacetylene welding torch. A vise or jig in which to hold the tool.

MATERIALS

Silver brazing alloy shim of 0.003 to 0.008 in. thickness with a melting point of 1175 deg. F. maximum. Flux to dissolve oxides on high speed steel, and which will be fluid and active at brazing temperature. A good grease solvent.

PROCEDURE

1. Machine or grind a recess in the shank to match the tip. Make sure that the surfaces of both recess and tip are fairly smooth. A milled surface or equivalent is satisfactory.
2. Clean all surfaces to be brazed with a good grease solvent.
3. Place the shank in the vise or jig with the recessed end projecting.
4. Coat the recess and the tip with flux.
5. Place the shim of silver brazing alloy on the entire recessed surface to be brazed and place the tip on the shim.
6. Apply heat with the oxyacetylene torch, using neutral or slightly reducing flame. Direct the flame to the underside of the shank below the recess, moving the flame back and forth to distribute the heat evenly. Heat the shank until it becomes a barely visible dull red.
7. Withdraw the flame to a greater distance from the work and continue heating until the brazing alloy melts, keeping the temperature as low as possible in order to avoid drawing the temper from the tip.
8. Make sure the alinement of the tip is correct, then press the tip firmly into place. Maintain the pressure until the brazing alloy has solidified.
9. When the brazing alloy has solidified, immerse the tool in oil long enough to set the braze, then cool in air. The hardness along the cutting edge should be comparable with that of solid hardened high-speed tools.

BUTT JOINTS

In joining a tip to a shank with a butt joint, the procedure is similar, except that additional care must be taken to make sure that the alinement is accurate.

HIGH TEMPERATURE

This method is used for tipping with annealed high-speed steel.

APPARATUS: A high heat furnace of the type used for hardening solid high speed tools, or for brazing tungsten carbide bits. It is advantageous to have the furnace of a type in which the heat can be localized on the end of the tool. Also, a preheating furnace is useful; but if not available the required preheat may be applied in the cooler portions of the high heat furnaces.

Copper Brazing

MATERIALS

Copper shims 0.003/.005 in. in thickness, brazing flux and good grease solvent.

PROCEDURE

1. Machine or grind a recess in the shank to match the tip. Make sure that the surface of the tip which is to be brazed is fairly smooth. A milled or ground surface is satisfactory.
2. Remove all grease and dirt with the solvent.
3. Coat the tip and the recessed end of the shank with brazing flux.
4. Place the shank in the furnace, and heat until the flux flows freely. Maintain a neutral or slightly reducing atmosphere.
5. Remove shank and fit the copper shim into the recess. Fit the tip onto the shim.
6. Preheat the assembled tool to about 1600 deg. F. in the preheating furnace or in the cooler portion of the high heat furnace.
7. Transfer the tool to the high temperature furnace and hold it at the proper quenching temperature for the grade of high speed (2200 to 2350 deg.), until the tip has heated through. Soaking time should be kept to a minimum to prevent grain growth. Since the melting point of copper is 1980 deg. F., the copper shim will have melted and spread over the interfaces. Withdraw the tool.
8. Adjust the alinement and press the tip firmly into place to squeeze out the excess copper and flux.
9. As soon as the copper has solidified, quench the tipped end in oil until the temperature has dropped to below 200 deg. F.
10. Temper the tool at 1000 to 1050 deg. F.

Ferro-Alloy Cement

MATERIALS

Ferro-alloy cement, copper sulphate, sulphuric acid.

PROCEDURE

1. Prepare a flat surfaced recess for the tip. The surfaces to be joined should be fairly smooth. Milled finish or equivalent is satisfactory.
2. Clean surfaces with the grease solvent.
3. Prepare a solution of 3 oz. of copper sulphate and 10 drops of concentrated sulphuric acid, dissolved in 1 pt. of water. With this solution paint the surfaces to be joined.
4. While the surfaces of the recess are still moist sprinkle over them a layer of commercial ferro-alloy cement. Smooth out the layer so that it is flat and about 1/32 in. thick.
5. Press the tip firmly into the recess and set the tool aside for an hour or more. This will affix the tip securely enough to permit handling.
6. Preheat the tool to about 1600 deg. F., in the preheating furnace or in the cooler portion of the high heat furnace.
7. Transfer the tool to the high temperature furnace and raise it to the quenching temperature proper for the grade of high speed involved (2200 to 2350 deg. F.). Keep the soaking time to a minimum.
8. Withdraw the tool and press the tip into the recess to squeeze out excess cement, using foot treadle press for tongs.
9. Check the alinement.
10. When the cement has solidified quench the tool in oil or air until the temperature has dropped below 200 deg. F.
11. Temper the tool at 1000 to 1050 deg. F.

Arc Welding Processes

Conservation of high speed steel can also be achieved by arc welding an H.S.S. tip on a low alloy shank, using 18-8 stainless steel electrodes. Stainless steel, being austenitic, does not harden and therefore leaves a ductile weld juncture which is not subject to cracking. The main caution is to avoid excessive grain growth of the high speed steel due to overheating. It is well not to spread the weld over too large an area, but if the contacting surfaces of the tip with the shank are perfectly flat, little welding will be required to provide proper heat transfer from the tip to the body. Tips can be welded

in a notched section at the end of the tool shank or simply welded on to the butt end of the shank. Before welding, such high speed steel points can be forged in a swage, annealed, then cut to length in a power hack saw. It is considered good practice to give all welded and forged tools a good annealing after these operations.

Arc welding may also be applied to the reclamation of broken tools, including twist drills, milling cutters, saws, etc. One method, widely used, employs atomic hydrogen welding, in which the filler material is scrap high speed steel. Prior to welding, the cutters are annealed at 1300 deg. F. to prevent breakage as the result of

stresses incurred by the welding heat and the welding itself is carried on while the tool body is held at a red heat. After welding, the cutters are stress relieved again, machined and then heat treated in the conventional manner.

High speed steel electrodes are also being used for repair purposes. Preheating of the tool is done in a mercury bath at 750 deg. F. In the process, no appreciable reduction in hardness adjacent to the weld deposit is encountered. The same method can be used for the composite construction of such tools as lathe, planer, cut-off, shaper and special forming tools by depositing a layer of high speed steel on the tip.—ED.

for High Speed Steel

WELDING

RESISTANCE FLASH WELD

This method is particularly adapted to butt welding a high speed steel tip to a simple steel shank, but may also be used for welding a tip to the face of a simple steel shank adjacent to the end, although considerable care is required in this procedure.

It is desirable for butt welds, that the areas of the sections of the two parts to be welded be as nearly equal as possible in order to avoid disproportionate rates of heating. A difference of 10 per cent is the maximum allowable.

APPARATUS: A tempering furnace. A standard resistance flash welder, manually operated or motor or hydraulically driven, and equipped with changeable copper dies machined to fit the contours of the sections to be gripped during welding.

Hardened High Speed Steel

PROCEDURE

1. Preheat the parts to be welded to about 1000 deg. F.
2. Clamp the tip or stub in one pair of welding dies, and the shank in the other pair. Make sure the alignment is correct.
3. Weld. The duration of the flash, the pressure, and the amount of upset required for an efficient resistance flash weld can be determined only through experience. Assistance may be obtained from the manufacture of the welder.
4. Immediately at the conclusion of the weld, place the tool in the furnace at a temperature of 1000 to 1050 deg. F. and maintain this temperature for about 2 hr. This will relieve thermal stresses at the welded section. The tool should not be permitted to cool in air from the welding heat.
5. At the end of the tempering period, remove the tool from the furnace and cool in air.
6. Remove and flash and dress the upset.
7. Form the cutting edge.

ACKNOWLEDGMENT

As part of a nationwide campaign to conserve the limited supply of cutting tools, the Conservation Division of the WPB has issued the above charts on approved methods of tool tipping so that the reader can see at a glance the apparatus and materials needed and the various steps of procedure under these different methods of brazing and welding. Although many plants have encouraged economy in varying degrees in the past, conservation throughout industry now becomes an emergency must.

Annealed High Speed Steel

PROCEDURE

- 1-3. Same as for hardened high speed steel.
4. At the conclusion of the weld, bury the tool in lime, mica, ashes or other inert material until cool, to prevent excessive thermal shock.
5. Anneal the tool according to high speed steel practice.
6. Remove the flash and dress the upset.
7. Form the cutting edges.
8. Harden and temper according to high speed practices.

Forged Tools

- 1-5. Same as above.
6. Forge. Then cool in lime, ashes, etc.
7. Anneal according to high speed practice.
8. Form the cutting edges.
9. Harden and temper according to high speed practices.

MECHANICAL TOOL HOLDERS

Mechanical tool holders are well adapted to the requirements of high speed steel. They are designed to hold cutters for lathe and planer tools, and consist of a simple steel shank with a recess through one end, in which the cutter is held in place by a set screw. Thus, a relatively small inserted cutter replaces the high speed steel content of a solid tool. They are particularly useful from a conservation standpoint in sizes below about 1/2 in. since the various brazing and welding methods of tipping are not economically suitable to sizes under 1/2 in.

On the other hand it is most desirable to employ small bits mechanically held in large section shanks for heavy duty planer and boring mill work. Here, because the tool shank may be several feet long and 2 x 2 in. or more in cross-section, the saving over a solid forged shank is enormous.

PRESSURE WELD

This method is suitable for joining high speed steel stubs to simple steel shanks. The minimum size that can be welded economically is about 1/2 in.

APPARATUS

Manual, mechanical, or hydraulic pressure machine that can apply 4000-4500 lb. per sq. in. of pressure. Pressure gage capable of measuring twice this pressure. Alignment holding jigs. Heating apparatus, variable with size and shape of cross-section to be welded, providing for oscillation of flame through a short distance above and below weld section. Auxiliary furnace capable of attaining temperature of about 1650 deg. F. for slow-cooling welded piece.

PROCEDURE

1. Cut sections to be welded. A smooth machine finish or equivalent is satisfactory. The cut must be perpendicular to the length of the pieces.
2. Secure the high speed steel stub and simple steel shank end to end in the welding apparatus. Apply an initial end pressure of about 1000 lb. per sq. in. of joint cross-section.
3. Ignite the gas in the heating head. Adjust the flame to a neutral or slightly reducing ration.
4. Oscillate the heating head across the weld interface through a distance of about one-third the weld face diameter in either direction from the weld face, allowing a slightly longer play of flame on the high speed steel side. The pressure will now rise rapidly due to thermal expansion of the heated sections. Then as the metal in this weld zone becomes heated into the plastic range the pressure gradually falls off. This will be at a temperature of 2300 to 2500 deg. F.
5. When the welding pressure has dropped to a predetermined value of between 3000 and 4000 lb. per sq. in., maintain this pressure, either manually or automatically. Upsetting will now take place.
6. When a predetermined optimum weld upset has been reached, release the pressure, and remove the piece.
7. Immediately transfer the piece to the annealing furnace at about 1650 deg. F.
8. Cool the piece to room temperature at the rate of 100 deg. F. an hour or slower. If this cooling cycle is followed, a hardness of 325 Brinell or less will result.
9. Remove the excess weld metal.
10. Machine the cutting edges.
11. Heat treat the tool according to standard high speed practice for the grade.

Detailed articles describing and illustrating these various processes in detail are available from THE IRON AGE in pamphlet form under the title, "How to Make Cutting Tools Last Longer," price 35c.

Material Handling System Pays for Itself in

THE war work of Oliver Farm Equipment Co., Springfield, Ohio, includes the production of bomb crates, and this department works three 8-hr. shifts. To speed this work and to effect economies in production, A. G. Schneider, material control supervisor, worked out a new system for handling steel from the receiving platform through production with the aid of power trucks in place of hand trucks. The system has

made a gross reduction of cost over a 10-month period amounting to \$5935.45. The required equipment, costing \$4316.20, has been paid for out of savings and is good for an indefinite number of years of service. The story is graphically told in the series of photographs reproduced here.

On each of the five former material handling operations—receiving dock to hand truck, hand truck to steel storage, stores to shears, shears to

stores, stores to fabricating machines—a saving of 15c per ton has been demonstrated. This total of 75c per ton, applied to the 6515 tons of sheet steel handled in the 10-month period, plus additional steel tonnage of 5246 tons on which 20c per ton was saved, reveals a gross saving of \$5935.45.

Referring generally to the new system for handling steel, there are undoubted advantages in the high tiering of material that represent definite savings, which cannot be reduced to cold figures. Elimination of congestion in storage and manufacturing areas is an economic gain, especially in a plant suddenly called upon to increase its daily output of finished product by 100 to 200 per cent. Some idea of the performance of the lift truck may be gained from the fact that in one 24-hr. period the plant received and stored 553 tons of steel and there were times when the crew, awaiting deliveries, was diverted to other material handling jobs. The rate of handling incoming steel averaged 23 tons per hr.

The whole philosophy of material control is to reduce handling costs by handling less often, by handling large units instead of small units, by multiplying floor space by high stacking and by serving production machines in a manner that eliminates back-breaking labor and keeps fabricating processes going at top speed.



ABOVE

A POWER finger lift truck, with finger spread of 60 in., removes the bundles 10 ft. long from the trailer truck bed and tiers them seven high, thus storing 42,000 lb. of steel on a floor area 10 x 3 ft. This unloading and storing was formerly accomplished by breaking the bundles on the truck, loading sheets by hand to factory trailer, pushing it to storage and piling sheets by hand, at a labor cost of 20c. per ton. Storage tiers were limited in height by the ability to pile sheets by hand. The new method costs 5c. per ton. It formerly took a minimum of 4 hr. to unload and store a truck load—a job now accomplished in 20 to 30 min., thereby releasing motor truck equipment for more trips per day.

o o o

RIGHT

ONE of the two new shear dollies (built at a cost of \$200 each) on which the sheets are now deposited by power truck. Strapping and skids are left in the storage room. Since the dolly is at shear bed height, one man feeds the shear (left). This operation is on a 24-hr. basis and one important consideration in the selection of power truck equipment was the ability of the gas-powered truck chosen to operate continuously for a 24-hr. stretch. Here again, handling costs from storage to shear were cut from 20c. to 5c. per ton. In the old method, the sheets were transferred from storage to the shear one sheet at a time on hand trailers.



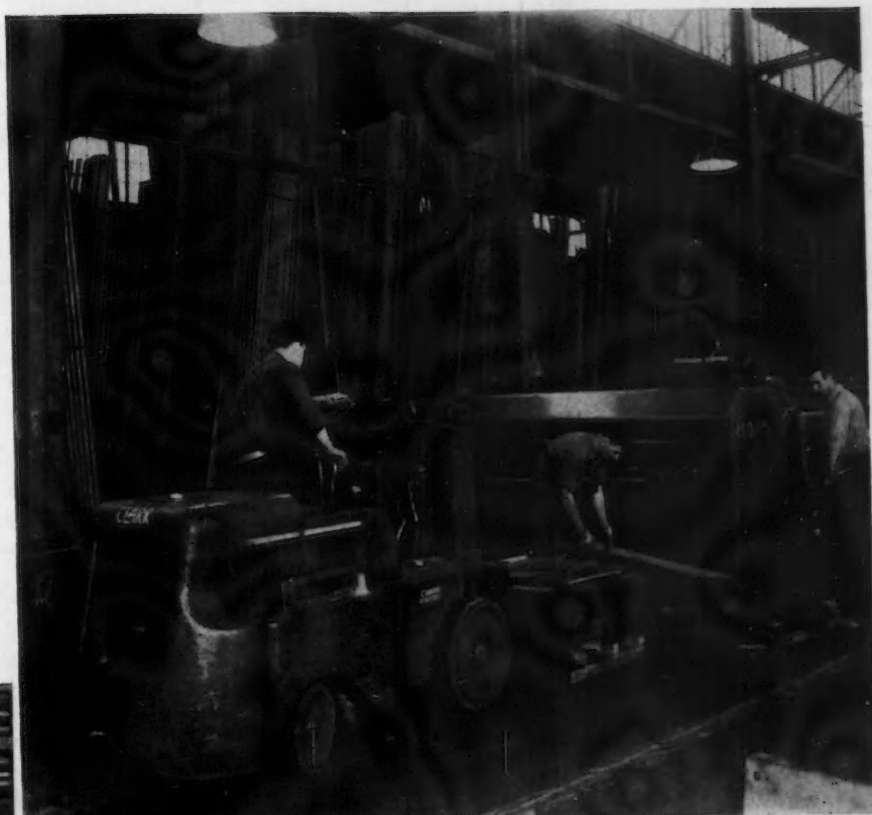
f in 10 Months

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RIGHT

SHEARED shapes being removed as a pallet load for transfer to the fabricating department. From salvage lumber, 30 wood pallets were built to receive various shapes as discharged from the shear. This is a 24-hr. operation and here again costs have been reduced 15c. per ton.

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BELOW

THE handling of materials for the plant's normal production of farm machinery has been similarly systematized. This view shows inventory being checked at the permanent steel racks where incoming material is stored. The bundled steel shapes shown have just been picked off a similar pair of wood skids on the deck of the motor delivery truck. On this operation a saving of 20c. per ton has been achieved. Here an added advantage of this system of material handling and storage is made evident—simplified inventory. Packages of shapes, wired or steel-strapped in standard bundles at the mill, are unloaded, stored and transferred to production as units of known value. Packages are broken only when they reach the point of fabrication.

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ABOVE

SHEARED shapes being placed in temporary storage, pending fabrication. The illustration shows the truck operator handling two of the long steel frames of shapes in one load. Altogether 60 wooden and steel frames were made of scrap material to receive various shapes as discharged from the shear.

o o o



War Finishes Dominate

"INDUSTRIAL Paint Coatings" were discussed by W. H. Lutz, technical director, Pratt & Lambert, Inc. Today paint is available in profusion of forms and compositions, but practical industrial paints are limited to five or six basic types, he pointed out.

The oldest and probably the most familiar type is linseed oil paint. In addition to pigment, it contains linseed oil as a binder, thinner to control consistency, and a small amount of drier to accelerate drying and hardening of the film. Linseed oil paints dry so slowly that they are rarely used for industrial purposes, but they do find wide application in the maintenance field. Oil paints are generally selected when economy, protection and easy brushing qualities are basic considerations but fine appearance is only secondary.

For industrial work, enamels are preferred to paints. Enamels differ from oil paints in that the vehicle is varnish, rather than linseed oil. Enamels belong to the aristocracy of the paint world, serving where quality and fine appearance are demanded. In addition to these virtues, industrial users also require certain standards of serviceability and drying.

Tung (or China wood) oil ranks second to linseed oil in paint making importance. It is more expensive than linseed oil, and its price has fluctuated fantastically, especially during recent years. In spite of unfavorable economic factors, tung oil has become a valuable paint oil, for it dries faster than linseed oil and it is more water resistant. In wrinkle finishes, tung oil is the ingredient responsible for crinkly texture. In many industrial finishes, tung oil is synonymous with positive drying, durability and washability.

The resins used by the paint industry are usually divided into two classifications—natural and synthetic. Rosin is one of the few natural resins familiar to the public.

The first man-made resin to attain widespread use was ester gum. It is made by reacting rosin with glycerine. Ester gum is probably the most popular of all paint resins, but it promises to be a war casualty, since glycerine is an important constituent in military explosives.

There are a multitude of synthetic

resins, but two types have achieved greater importance than others: Phenolics and the alkyds. Phenolic resin is manufactured by reacting phenol (carbolic acid) and formaldehyde—two powerful and commonly used germicides. The first appeal of phenolic resin was its accelerating influence on drying. In addition, phenolic finishes are harder, tougher, more serviceable and far more resistant to alkali and moisture than finishes containing other resins. In these qualities phenolic resin outstrips ester gum as far as the latter outdistances rosin. Phenolic resin coatings are used today wherever unusual resistance to moisture or corrosion is demanded. Examples include: Food can coatings which must withstand pasteurizing or cooking treatments, and collapsible tube enamels requiring resistance to alkali. Phenolic vehicles are not without their disadvantages. In general, they are costly and rather dark in color, thus precluding their use in white enamels.

Alkyd resins are comparative newcomers in the resin field, but they have won a very important place during recent years. They are generally made by reacting glycerine and phthalic anhydride, which in turn is derived from naphthalene (the chemical name for the humble moth ball). Alkyds are invariably modified by the incorporation of oils or other resins. As a class, alkyds are characterized by good adhesion, excellent color and unusual exterior serviceability, including good gloss and color retention on exposure. Probably the most extensive use of alkyd resins has been in the automotive field, where alkyd enamels have largely supplanted lacquers. The finish on Ford cars is a familiar example. Alkyd finishes are also widely used for other purposes, such as metal furniture, fixtures, mechanical devices and automotive parts.

The alkyds have been combined within the past few years with urea resins to yield unique industrial finishes. Urea resins result from the reaction between formaldehyde and urea, a fertilizer synthesized from ammonia and carbon dioxide. Urea resins by themselves produce brittle and poorly adhering films; but combined with alkyds they make hard, mar-resistant and chemically resistant finishes. They make exceptionally

fine white enamels which can be baked at high temperatures without discolorations. Unlike the finishes thus far discussed, the urea-alkyd combinations will not dry but must be cured at temperatures ranging between 225 deg. and 350 deg. F. They have been widely used on household appliances—stoves, washing machines, refrigerators, etc.

Two other resinous coatings warrant brief mention, although their service record has been limited: The vinyl and acrylic resins. They have water-white color and excellent color permanency. In addition, they are very resistant to water, gasoline, solvents, fruit acids, chemical fumes, oil and grease. They are odorless and tasteless, qualities which made them popular as coatings on the inside of pre-war beer cans and on paper liners for food jar tops. Both vinyl and acrylic resins are costly, rather difficult to apply and require baking for maximum adhesion, but these disadvantages have not discouraged an enormous wartime use, for neither resin is now obtainable except for military purposes. It is probable that these resins will be even more popular in the future.

There is one remaining widely used type of industrial finish and that is lacquer. Though it is being discussed last, it is by no means least important. Lacquer differs from most other coatings in that it dries solely by solvent evaporation. Oil, varnish and synthetic resin coatings dry by oxidation or polymerization, or by both. Lacquer consists of a solution of nitrocellulose in organic solvents, together with modifying agents such as plasticizer and resin. Lacquer dries faster than other paint coatings and produces a hard, tough and water-resistant film in a matter of minutes. Lacquer has the disadvantage of softening and sometimes redissolving in alcohol and certain other organic solvents. Clear lacquers adhere fairly well to bare metal, but lacquer enamels require special primers to insure adhesion.

Clear lacquers have been rarely used on ferrous metals, but rather on copper and brass, silver and aluminum. Clear lacquers are used in preference to varnish on decorative metals because they do not alter the appearance of the metal to any great

e Electroplaters' Convention

degree. In order to minimize appearance changes and attain maximum adherence, lacquers are invariably applied in thin films.

Formerly, shiny, high-gloss finishes were popular because they made an industrial product look new. More recently there has been a trend toward duller finishes and effects. Now the bottom of the gloss scale has been reached in lusterless military paints, so dull that they reflect no light and cannot reveal the presence of military objectives to enemy planes. In any event, dull finishes offer distinct industrial advantages over glossy finishes, for they make imperfections less conspicuous. They are, however, generally less serviceable than glossy finishes. Dullness is achieved through high pigmentation, which means poorer outdoor durability, decreased resistance to moisture and staining, and poorer washing and cleaning qualities.

About 85 per cent of all industrial paints are sprayed, but finishes can be custom-made to fit any other preferred method of application—such as dipping, tumbling, roller coating or knifing.

Baking temperatures usually range from 150 deg. to 350 deg. F. Lower temperatures fail to accelerate drying to a sufficient extent, and higher temperatures often result in discoloration, dulling or actual decomposition. Black japans are an exception in that they are frequently baked up to 450 deg. F. Temperatures in excess of 500 deg. F. cause rapid destruction of organic films.

If paint is to do a good job, proper surface preparation is just as essential as it is in plating. Grease, corrosion, dirt and foreign matter affect the adherence and protective value of all organic coatings, and money spent in proper surface preparation is money well spent. In general, the same methods are used in cleaning metal for painting as for electroplating. After cleaning or simultaneously with cleaning, it is common practice to etch smooth metals in order to improve adherence of paint coatings. Phosphate treatments are very effective on iron or steel, and zinc surfaces. Aluminum is anodized or treated with caustic. Magnesium is usually given a chrome-pickle treatment (an etching mixture of sodium

... The trend towards duller finishes and effects is reaching the bottom of the scale with completely lusterless military paints, which are accompanied by their own problems of application and durability. In this, the third part of the report on the American Electroplaters Society's convention last month, industrial paint coatings and many aspects of surface preparation are reported.

bichromate and nitric acid). As an alternate to any of these chemical treatments, roughening can be accomplished by mechanical means, such as sand blasting or sand papering.

Saponification Rates

"Rate of Saponification in Metal Cleaning—A Preliminary Study" was reported by Robert Twynning and Edwin M. Baker, University of Michigan.

One of the most important industrial problems encountered in nearly every type of metal processing industry is the removing of saponifiable and unsaponifiable grease films from metallic surfaces. These grease films may be saponifiable fats and acids and saponifiable and unsaponifiable oils and waxes. The most common methods employed to accomplish this removal are solvent degreasing and saponification and emulsification in a hot alkaline solution.

Alkali cleaning is by far the most common present-day method and is ordinarily the least costly. Much emphasis has been placed upon whether a grease is or is not saponifiable. A matter, at least equally important in metal cleaning operations, is the time required to bring about saponification, since if the time is greater than may be allowed for the operation, a saponifiable material presents the same problems for its removal as does a material which is not saponifiable.

A special apparatus was used to determine the rate of saponification of five greases: Beef tallow, No. 51 Hydrofol acid, stearin pitch, No. 42 Hydrofol glyceride and stearic acid.

From the results it was evident that stearic acid (commercial, "saponified grade," double-pressed) had the lowest saponification rate of any fat or fat acid tested, while beef tallow had the highest rate. It is noted that the saponification rate of stearin pitch, No. 42 Hydrofol glyceride and stearic acid flattened off sharply after some 10 min. of reaction, indicating that for greater times the solubilities

of the soaps formed markedly retarded the rate of reaction.

It was apparent, for example, that if the thickness of the film were 0.0005 in., 8 min. would be required to remove this film by saponification alone at a temperature of 149 deg. F. by means of a solution containing 3.84 oz. of caustic soda per gallon. In contrast to this, a layer of equal thickness of hydrogenated stearin pitch would require only 1.3 min., beef tallow 1.4 min., No. 51 Hydrofol acid 1.8 min., and No. 42 Hydrofol glyceride 2.5 min. under the same conditions.

Mechanical agitation is often employed in "soak" cleaning. This mechanical agitation ordinarily consists in hanging the work from oscillating rods or on a conveyor. The resulting movement of the work through the solution causes a reduction in the thickness of the liquid film at the fat-liquid interface and therefore allows more rapid saponification due to decreased alkali and soap concentration gradients through the relatively stationary film of solution adjacent to the metal.

Surface Cleaning Methods

"Preparing Metal Surfaces Before Finishing" was presented by Edwin C. Rinker, Oakite Products, Inc. One of the most effective ways, and the most economical, of providing a clean surface is to immerse the work in alkaline cleaning baths that are operated near the boiling point to promote agitation.

A cleaning compound should provide saponification, emulsification, penetration, lowering of interfacial tension and deflocculation.

To illustrate the efficiency of various cleaning compounds in removing the wide variety of soils present on metal surfaces, the conditions of these soils were simulated in the laboratory. Cold rolled steel strips 3 in. x 6 in. were used as specimens. These strips were first treated to remove the anti-rust oils or surface films to

provide a clean surface. They were then individually dipped in one of a number of oils and then allowed to age for a period of two weeks. One set of samples was not treated or dipped. These specimens had the typical coating of lanolin, the rust preventive remaining on the surface. Solutions of the various types of cleaning compounds were kept at 200 deg. F. which provided mild agitation. During the course of the tests, the solutions were replaced in order to offset any effect of contamination. All specimens were treated in the following manner: Immersed in cleaning bath, rinsed in shower spray, acid dipped in a 5 per cent sulphuric acid solution, rinsed in shower spray and examined for water break.

The pieces were considered free of all soil if no water break appeared. Several hundred tests were made using a time cycle of 3, 6, 9, 12 and 15 min. in the cleaning bath.

From the results of these tests, definite indications were obtained that rosin-silicate type of cleaner is a more efficient compound, especially for immersion cleaning. Mechanical agitation of the work or solution, or both, of course, improves the efficiency.

In choosing an alkaline compound for use in metal cleaning equipment, the choice of cleaning material will depend primarily on the type of machine available. For instance, it would be inadvisable to use a rosin-silicate type of cleaner or one containing other soaps or synthetic wetting agents in a high pressure spray type washing machine as these materials would cause excessive foaming. Concentrations generally used in metal washing machines are $\frac{1}{4}$ to 1 oz. per gal. It is advisable to dump the solution frequently in order to keep the equipment in first class condition.

In recent years acid cleaners have been developed which are successful in spray washing machines to remove light films of oil and solid matter from steel. These materials contain suitable emulsifiers and active agents that aid in the removal of the oil films, the acid providing a very slight phosphate coating and also etching the surface microscopically.

This type of cleaner provides for better adherence of painted coatings, some resistance to corrosion under the paint film, and resistance to corrosion between the time the work is cleaned and painted.

Furthermore, this acid cleaning mixture, when not completely rinsed off and allowed to dry down, does not

interfere with adhesion of the paint film.

In many instances where the steel surfaces are too soiled for the acid cleaner to clean satisfactorily and the metal washing equipment has three compartments, the following steps are taken: Spray wash in alkaline compound, spray rinse, spray wash with acid cleaner and dry in regular manner.

As spot welding of aluminum is a resistance weld, it is of primary importance that the surfaces provide perfect electrode contact. To secure uniform electrode contact, it is essential that all oil, grease, identification marks and dirt be removed. Of equal importance is the removal of all metallic oxides. These metallic oxides are non-conductors and will interfere with the proper conduction of the accurately controlled welding current. Furthermore, a high resistance between the surfaces is set up, causing the weld to take place between the electrode and the sheet, necessitating frequent sanding and machining of the welding tips in order to secure perfect electrode-to-sheet and sheet-to-sheet contact. Grease, oil, identification marks and shop dirt are removed by immersion in an alkaline cleaner, properly inhibited to prevent attack on the aluminum, until a non-water-break surface is secured. Incomplete removal of above soils will prevent uniform action in the non-etching acid type of material.

Following the alkaline cleaning operation, the work is thoroughly rinsed and then immersed in an acid solution for varying periods of time, depending upon the alloy used.

Reclamation of rejects of anodized aluminum sheets and castings can be accomplished by immersing the work in the hot acid solutions, using 6 oz. per gal. at 180 deg. F. for periods varying from 15 to 45 min. Stripping of anodizing from aluminum containers and racks is accomplished in the same manner, the advantages being no alteration or dimensional change in the aluminum surfaces stripped, and increase of life of the anodizing racks or containers, as the loss of weight and corrosive action on the metal is negligible.

The usual method of preparing for Alrok finish is to clean in an uninhibited alkaline material, rinse in clean running water, nitric acid dip and rinse.

A uniform chemical film can be secured without etching or changing the structure of the original surface by the following method: Clean in an

inhibited alkaline cleaner, rinse thoroughly, immerse in the non-etching solution and rinse.

Degreasing Machine Practice

"The Operation of Modern Degreasers" was a paper by John W. Dammers, G. S. Blakeslee & Co. Degreasing is for the removal of oils, greases, gums, waxes, rouges, tar, resins, and metal chips from metal parts after stamping, machining, threading, cutting, grinding, quenching, polishing and buffing, in preparation for electroplating, enameling, japanning, inspection, assembly, bonderizing, galvanizing, pickling, etc. Chlorinated solvent used does not oxidize or corrode any of the metals.

There are five definite principles to watch for in a metal degreasing machine. The machine must be designed with a minimum surface evaporative area because of the fact that for every square foot of evaporative area exposed to the air $\frac{1}{20}$ lb. of solvent is lost at boiling temperature and $\frac{1}{200}$ lb. at room temperature per hour.

A degreasing machine must have a definite heat balance. In other words, the heat put in must be balanced by a suitable sufficient and efficient cooling medium to control the vapor level.

The freeboard on a degreaser is determined as $\frac{1}{2}$ to $\frac{6}{10}$ of the width of the degreaser. If a machine is 30 in. wide, the freeboard or the distance from the vapor level to the top of the machine should be $\frac{6}{10}$ of 30 in. or 18 in. The minimum freeboard should be 12 in. to 14 in.

The hanging of the work so that it will not fan the vapors or displace them, when going in and out of the machine, or cause drag-out of solvent, is most important in degreasing design.

A dead air space in a part to be degreased should be eliminated by proper handling and turning over of the work going in and out of the machine so as not to saturate the air within the pocket with solvent vapors.

Caution should be exercised against the overloading of the unit and putting through more work than the machine was designed for. Withdrawal of the work from the degreasing machine before it is fully up to temperature will bring the work out with a liquid film of solvent instead of a unimolecular film, which will increase the degreasing cost about six-fold and cause pollution in the atmosphere around the degreaser from 100 to 150 parts per million average to about 600 to 700.

Heating of the degreaser is best accomplished by steam at 10 to 15 lb.

pressure. Trichlorethylene would decompose at a temperature exceeding 260 deg. F.

The degreasing machine should be located out of drafts, and should not be placed in doorways or in front of windows, regardless of the direction of drafts, as it has been found that any draft across the top of the unit causes not only loss of solvent but also an increased concentration of solvent in the surrounding atmosphere. The unit should not be any closer than 50 ft. to furnaces, ovens, or any apparatus having a gas flame or a surface temperature in excess of 500 deg. F.

Exhausting of a degreasing unit should not be considered as a means of solvent vapor control. It is merely a means for removing solvent vapor that is already out of control. Improper design and operation of exhaust equipment can create a more hazardous condition than no ventilation at all.

There are three types of degreasers: Vapor, liquid immersion, the vapor spray or slush. The liquid immersion may be by hand, with one, two or three dips with a vapor rinse, or it may be done with an automatic conveyor with the parts in baskets or suspended from a conveyor. The straight vapor type limits itself to parts that are heavy enough to combat temperatures long enough to allow for sufficient condensation of vapors on the work to put into solution thoroughly the oils and greases to be removed. Nested types should be cleaned in a liquid immersion unit. The third type, or vapor spray machine, like all the other models, can be had in a hand-powered or conveyor-operated model. The spraying of the parts, after which they are given a vapor rinse, can be accomplished by a hand hose or spray jets, or by fixed jets in the automatic models.

Degreasing machines vary from desk units, 6-in. cube, up to machines 70 ft. long and 25 ft. high for cleaning refrigerators, airplane wings and the like. Aluminum foil 0.0025 in. thick up to strip steel $\frac{1}{8}$ in. thick and 30 in. wide, is cleaned at speeds of 30 to 350 ft. per min. The reduced floor space, and a tremendous amount of heat saved, together with a more thoroughly cleaned finished product, free of streaks, stains, spots and marks, have added tremendously to the rapid development and expansion of degreasing.

Preparation by Anodizing

"The Practical Aspect of Plating Aluminum with the Krome Alume

Process" was described by Raymond F. Yates, Krome-Alume, Inc. This was a discussion of the plating of aluminum from the viewpoint of the man at the tank.

Whereas all previous attempts to plate aluminum and its alloys were initiated by efforts to denude the metal through the elimination of its natural oxide coating, the Krome Alume process carries the oxidation further by the creation of a dense anodic film. Only the mildest cleaners are called for in the cleaning cycle. Any tendency to etch the surface of the metal must be avoided if high luster is called for in buffing.

Any one of a number of cleaners may be used but perhaps the simplest and cheapest is sodium cyanide, 6 to 8 oz. to the gal., at room temperature with 6 v. d.c. Two minutes of such treatment should be sufficient. Where heavy deposits of grease are present, regular degreasing methods should be employed before the sodium cyanide cleaning.

Where dark deposits are brought out and remain on the surface of the aluminum alloy after cleaning, removal is quickly effected by a dip in a concentrated (30 Baume) solution of nitric acid.

In the case of certain casting alloys containing large percentages of silicon, dark films that appear subsequent to cleaning are more persistent, and in such cases the nitric dip will have to be followed by a dip in a solution of hydrofluoric acid $\frac{1}{4}$ per cent or $\frac{1}{2}$ per cent by volume. A final dip in concentrated nitric and rinse prepares the article for anodizing.

The physical and chemical properties of anodic formations on aluminum and its alloys depend upon the conditions of anodizing and respond to such variables as the nature of the solution, temperature, nature of the current and the composition of alloys treated. Although no reason beyond that of practical results over long periods of testing can be assigned, anodic formations produced in oxalic acid solutions by the aid of alternating current appear to offer the best results as far as adhesion for deposited metal is concerned.

Anodizing is initiated at 5 v. a.c. in a solution of oxalic acid running 4 oz. per gal. The rapid building up of the initial film permits an increase in anodizing voltage to 50 after the lapse of 1 min. Anodizing in all cases proceeds for 10 min.

The temperature of the anodizing solution gradually rises in a heavily worked tank, but should not be permitted to exceed 85 deg. F.

Racking for anodizing precludes

the introduction of any metal other than aluminum in either the rack or the metal to be anodized. Exposed metals other than aluminum unless properly stopped off, remain as open conductors in the solution and therefore short circuit the anodizing current immediately after the establishment of a slight initial film. Brass racks may be used as long as they are properly covered and the tips contacting the work are of dural metal.

The crux of the Krome-Alume process lies in the modification of the anodic film. Current practice involves the use of a weak solution of hydrofluoric acid running $\frac{1}{4}$ of 1 per cent by volume. Uniformity of results calls for the maintenance of this percentage by periodic analysis. Anodized articles are first rinsed and then exposed to the hydrofluoric acid for a period ranging from $\frac{1}{2}$ to 4 or 5 min., depending entirely upon the alloy to be plated. The purer forms of aluminum like 2S and 3S receive hard, dense anodic coatings that require longer modification periods. Where long runs of such metals are to be made, the time of the modification cycle may be reduced to 2 or 3 min. by increasing the concentration of hydrofluoric acid solution. In the case of durals, however, these heavier concentrations would work so rapidly as to become severely critical. Hence the weaker hydrofluoric solutions are indicated. Durals are thereby made available for plating at the end of 30 sec. and quick rinsing is necessary. Once modified for plating, anodic surfaces are perishable, although articles so treated may be left in clean rinse water for some time. Drying in the air proves fatal; the work would require stripping and re-anodizing.

With few exceptions the plating of aluminum proceeds under normal operating conditions after anodic modification. Aside from a brownish-black initial covering, nickel, both bright and gray, follows normal deposition as it applies to other metals.

If more rapid deposit is required for heavy coatings, the aluminum may first be covered with (in the case of copper) a deposit from an acid copper bath. Ordinary copper cyanide may also be employed if certain precautions in initial deposits are followed.

Next week, in the conclusion to this report, papers on unsolved electroplating problems, blackening of non-ferrous metals, protecting steel with Fe_2O_3 , and radiant heating are among the subjects reported.

The A

By PETER PAYSON

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Eastern Research Laboratory,
Crucible Steel Co. of America

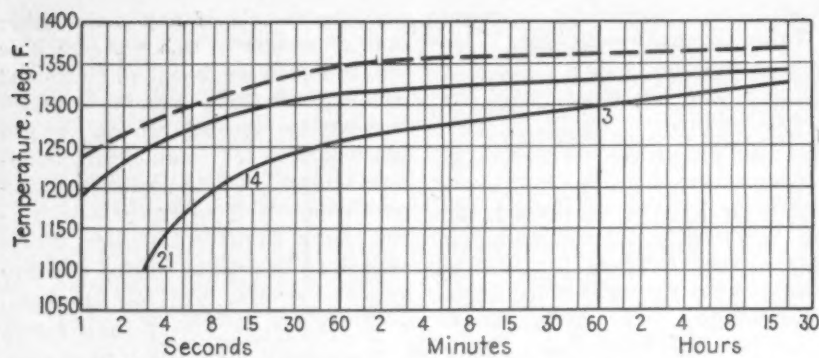


FIG. 14—SAE 1050 steel (0.46 C, 0.19 Si, 0.80 Mn, 0.17 Ni, 0.13 Cr); austenitizing temperature, 1425 deg.; prior condition, tempered at 1325 deg. for 2 hr.

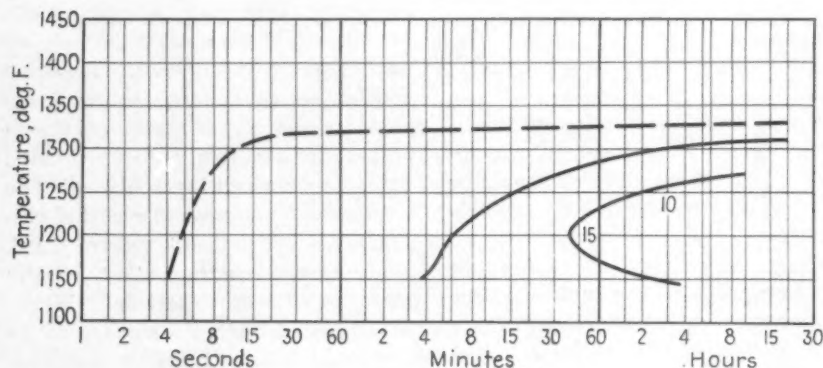


FIG. 15—A 4042 steel (0.43 C, 0.90 Mn, 0.23 Si, 0.23 Ni, 0.27 Cr, 0.26 Mo); austenitizing temperature, 1500 deg.; Acl temperature, 1365 deg.; prior condition, natural.

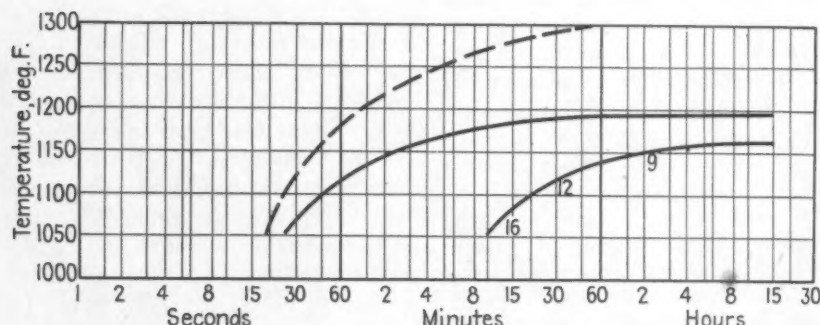


FIG. 16—SAE 2340 steel (0.38 C, 0.58 Mn, 0.29 Si, 3.11 Ni, 0.20 Cr); austenitizing temperature, 1400 deg.; Acl temperature, 1250 deg.; prior condition, tempered at 1240 deg. for 2 hr.

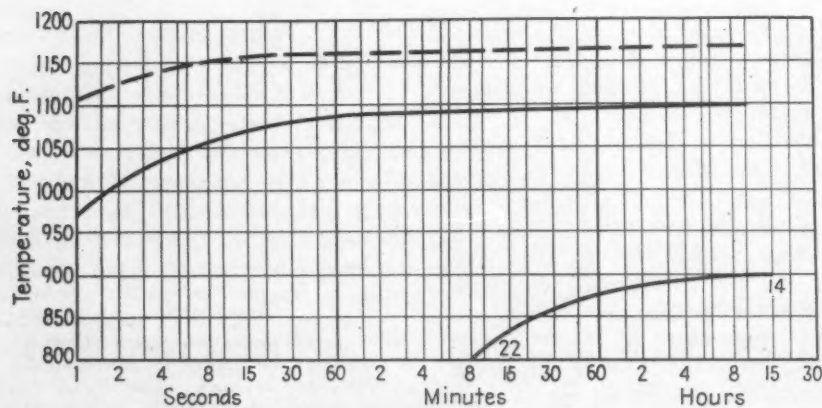


FIG. 17—SAE 2515 steel (0.14 C, 0.51 Mn, 0.22 Si, 5.29 Ni); austenitizing temperature, 1450 deg.; Acl temperature, 1170 deg.; prior condition, natural.

THE TTT curves for the annealing temperature ranges of a variety of steels are shown in Figs. 14 to 40. These give a great deal of the information which is needed for establishing an annealing cycle, but they should always be used with some precaution. The curve for a particular grade is usually based on samples taken from one heat of the steel. It has been found that different heats of similar analyses vary to some degree in their reactions to annealing, and therefore a successful annealing cycle must be sufficiently broad to cover the variations that may be found among various heats. This may be illustrated by the experience the author had in studying the annealing of Rex AA, the 18-4-1 high speed steel.

For this grade a maximum hardness of 255 Brinell is considered satisfactory for annealed stock, although some consumers prefer 241 Brinell, maximum. The TTT curve (Fig. 26) shows that the steel transforms completely in less than 30 min. at 1400 deg. F., but the hardness of the transformation product formed at this temperature is 24 Rockwell C, which corresponds to just about 255 Brinell. Since it was desirable for the operating department to have an annealing cycle which would give hardness values safely below the maximum, it was necessary to use a higher transformation temperature at which the product of transformation would be considerably softer, even though it would be necessary, according to the shape of the TTT curve, to hold the steel at the transformation temperature for a longer time. The curve showed that transformation was complete at 1470 deg. F. in about 3 hr. to a product which had a hardness about 20 Rockwell C. Accordingly, samples of bars varying from 1/4 in. rd. to 3 1/4

e Annealing of Steel

... In this, the fourth part of his five-part article on application to annealing of the modern viewpoint on the transformation of austenite, the author presents TTT curves for a wide variety of steels, and discusses annealing cycles based on TTT information.

in. sq. from about 20 commercial heats from different mills were pre-heated at 1500 deg. F. for 2 hr. (to simulate, somewhat, the slow heating of a large load of steel), then austenitized at 1650 deg. F. for 1 hr. at temperature, cooled in the furnace in about 1 hr. to 1470 deg., held at 1470 deg. for 3 hr., then quenched in water. Of the 20 samples, 14 were 22 Rockwell C, or softer, after this treatment; four were 25 Rockwell C, and two were 36 and 38 Rockwell C. The latter two samples, obviously, were not completely transformed at the time they were removed from the furnace. It was clear from these facts that

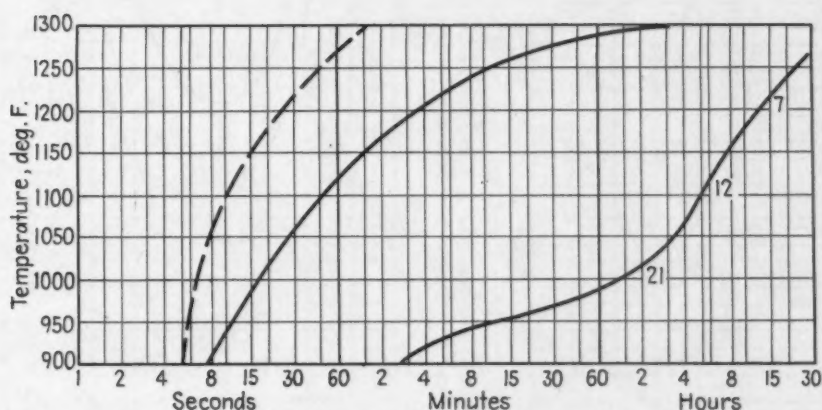


FIG. 18—SAE 4640 steel (0.41 C, 0.76 Mn, 0.11 Si, 1.85 Ni, 0.25 Mo); austenitizing temperature, 1450 deg.; Acl temperature, 1315 deg.; prior condition, tempered at 1300 deg. for 2 hr.

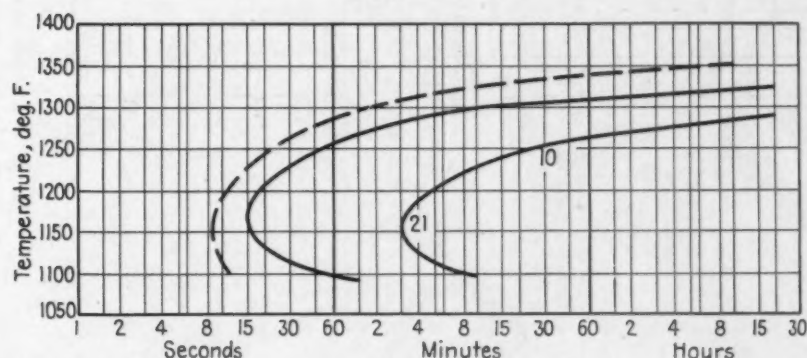


FIG. 19—SAE 3240 steel (0.41 C, 0.48 Mn, 0.27 Si, 1.68 Ni, 1.05 Cr); austenitizing temperature, 1450 deg.; Acl temperature, 1345 deg.; prior condition, tempered at 1325 deg. for 2 hr.

TABLE I

Examples of Short Time Annealing Cycles Based on TTT Curves

These Cycles Were Selected to Give Reasonably Low Hardness in Minimum Time. The Cooling From the Austenitizing to the Transformation Temperature Was Rapid. All Pieces Were Air-Cooled at the End of the Transformation Period.

GRADE	Approximate Composition, Per cent								Austenitizing, Deg. F Time, hr.	Transformation,		Brinell Hardness After Anneal	
	C	Mn	Si	Ni	Cr	Mo	W	V		Deg. F	Time, hr.		
Maxel 3½	0.50	1.00	0.20	....	0.50	0.15	....	....	1390	2	1300	4	179 to 197
4042	0.45	0.90	0.25	....	....	0.25	....	....	1500	2	1250	2	179
8620-8720	0.18	0.85	0.20	0.55	0.50	0.25	....	....	1600	1	1250	2	143
4132-4160	0.30 to 0.60	0.85	0.25	....	1.00	0.25	....	....	1425	2	1300	2	170 to 192
3130-3150	0.30 to 0.50	0.80	0.25	1.20	0.70	....	....	....	1425	2	1250	2	163 to 174
3240	0.45	0.50	0.25	1.80	1.00	....	....	....	1425	2	1260	2	187 to 192
4320-4342	0.20 to 0.45	0.70	0.25	1.80	0.80	0.25	....	....	1425	2	1210	8	163 to 235
4640	0.40	0.70	0.25	1.80	....	0.25	....	....	1370	2	1210	12	187
6150	0.50	0.80	0.25	1.00	....	....	....	0.20	1425	2	1310	4	192
9260	0.60	0.90	2.00	....	....	....	....	....	1450	2	1360	4	212
Tool steel	0.80 to 1.20	0.25	0.25	....	....	....	....	....	1410	2	1330	3	174 to 187
52100	1.05	0.30	0.25	....	1.40	....	....	....	1440	4	1340	4	197 to 207
High C, high Cr	1.50	0.25	0.40	....	11.50	0.50	....	0.25	1700	2	1430	4	223
High speed	0.75	0.30	0.30	....	4.00	....	18.00	1.00	1650	2	1400	4	255
High speed	0.85	0.30	0.30	....	4.00	4.50	5.50	1.30	1650	2	1400	4	217
Lo Cro 46 Mo	0.10	0.40	0.30	....	4.50	0.50	....	....	1550	2	1390	2	134 to 143
Stainless 12	0.10	0.40	0.25	....	12.00	....	....	....	1650	2	1310	3	137 to 152
Stainless B	0.60 to 1.00	0.30	0.25	....	16.50	....	....	....	Preheat				
									1400	2	1370	3	197 to 248
									1650	2			

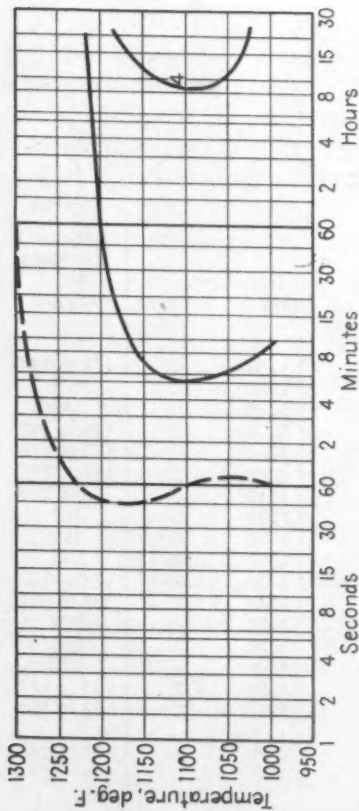


FIG. 20—SAE 3312 steel (0.10 C, 0.34 Mn, 0.20 Si, 3.51 Ni, 1.66 Cr); austenitizing temperature, 1450 deg.; Acl temperature, 1310 deg.; prior condition, natural.

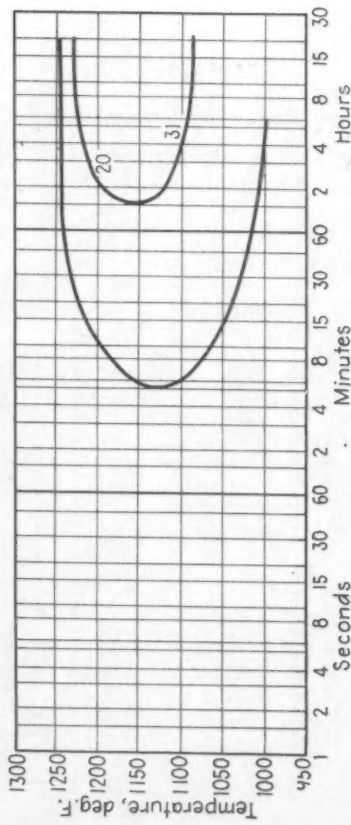


FIG. 21—Modified SAE 3360 steel (0.59 C, 0.34 Mn, 0.26 Si, 3.20 Ni, 2.26 Cr); austenitizing temperature 1500 deg.; Acl temperature 1260 deg.; prior condition, tempered at 1150 deg. for 2 hr.

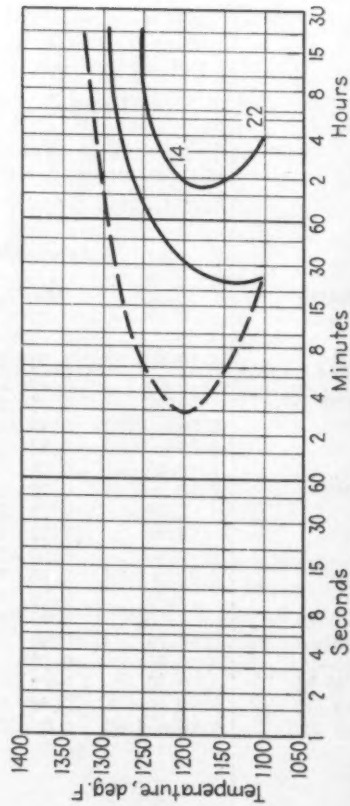


FIG. 22—E 4342 steel (0.43 C, 1.74 Ni, 0.68 Mn, 0.81 Cr, 0.18 Si, 0.29 Mo); austenitizing temperature, 1500 deg.; Acl temperature, 1305 deg.; prior condition, as rolled.

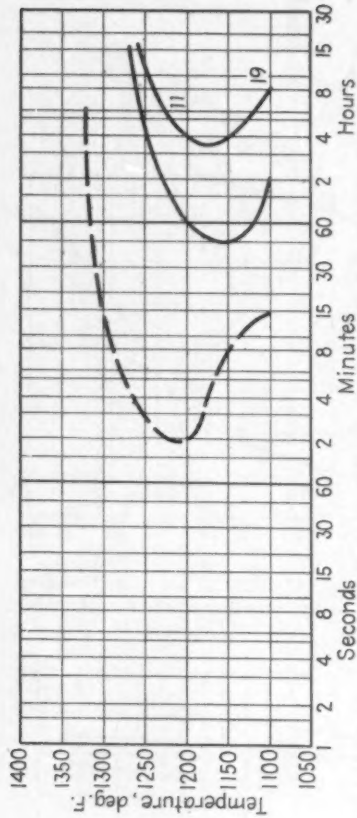


FIG. 26—NE 8442 steel (0.40 C, 1.43 Mn, 0.22 Si, 0.23 Ni, 0.29 Cr, 0.32 Mo); austenitizing temperature, 1500 deg.; Acl temperature, 1325 deg.; prior condition, as rolled.

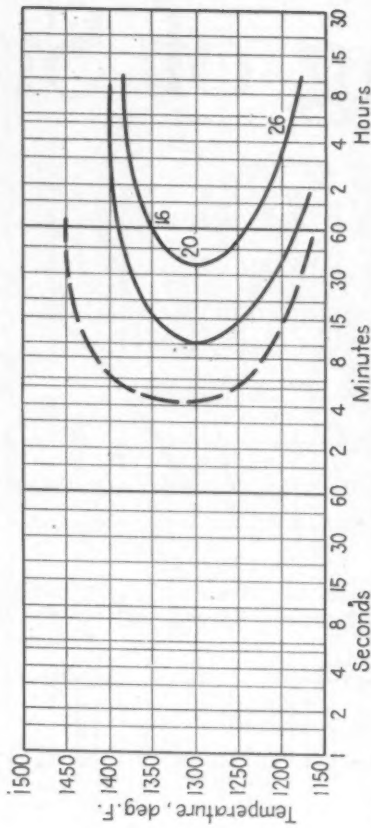


FIG. 27—Modified Nitralloy G (0.40 C, 0.64 Mn, 0.20 Si, 0.23 Ni, 1.81 Cr, 0.39 Mo, 0.96 Al); austenitizing temperature, 1750 deg.; Acl temperature, 1435 deg.; prior condition, natural.

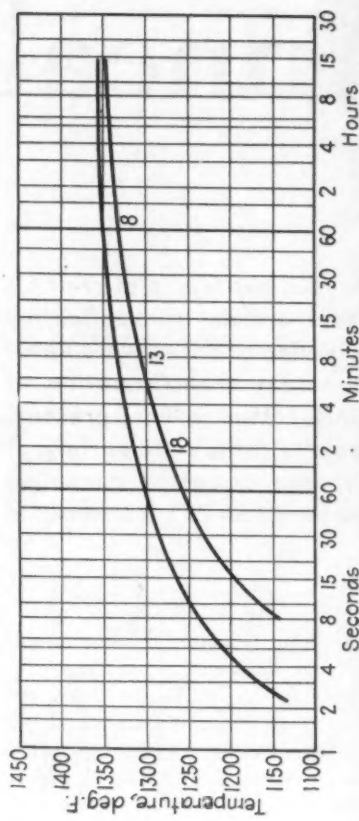
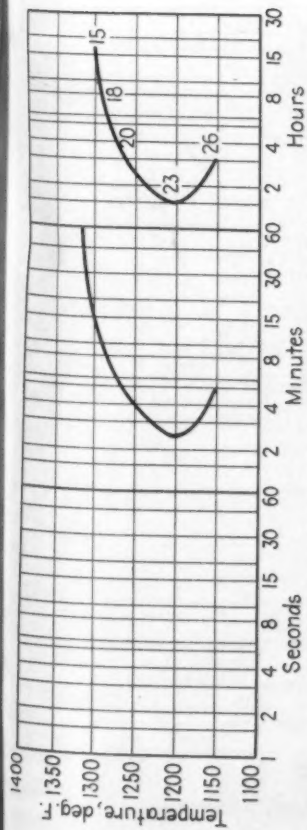
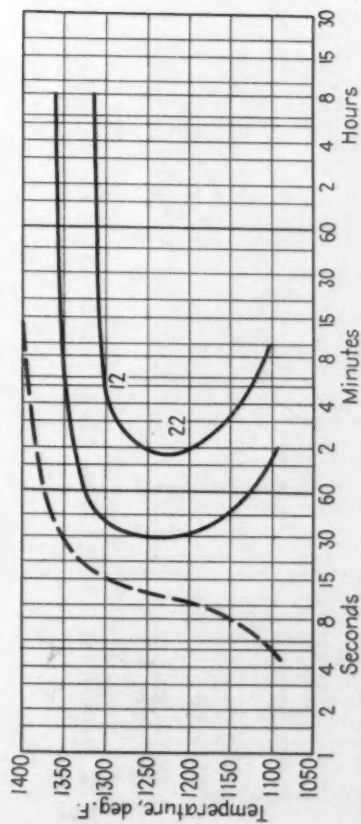


FIG. 28—0.85 C tool steel (0.23 Mn, 0.18 Si, 0.05 Ni, 0.07 Cr); austenitizing temperature, 1385 deg.; Acl temperature, 1370 deg.; prior condition, natural.

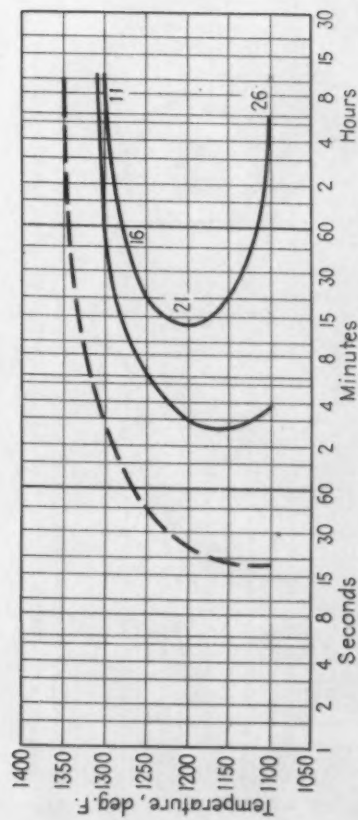
F IG. 22—E 4342 steel (0.43 C, 1.74 Ni, 0.68 Mn, 0.81 Cr, 0.18 Si, 0.29 Mo); austenitizing temperature, 1500 deg.; Acl temperature, 1305 deg.; prior condition, as rolled.



F IG. 23—Maxel 7 (0.71 C, 0.25 Ni, 0.89 Mn, 0.28 Cr, 0.29 Si, 0.94 Mo); austenitizing temperature, 1400 deg.; Acl temperature, 1330 deg.; prior condition, as rolled.

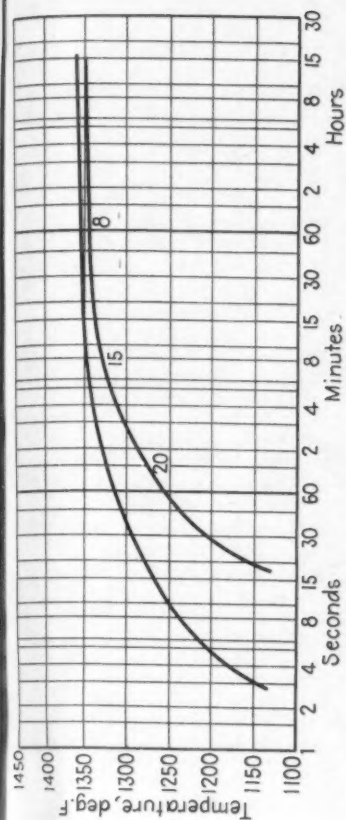


F IG. 24—SAE 6150 steel (0.50 C, 0.95 Mn, 0.19 Si, 0.22 Ni, 1.03 Cr, 0.20 V); austenitizing temperature, 1450 deg.; Acl temperature, 1390 deg.; prior condition, tempered at 1350 deg. for 2 hr.

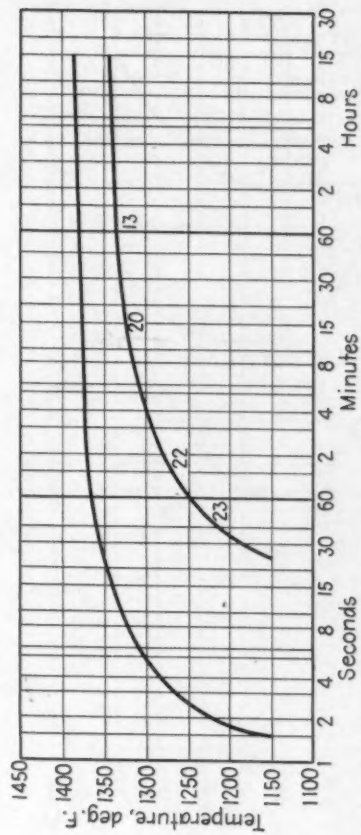


F IG. 25—NE 8749 steel (0.52 C, 0.85 Mn, 0.21 Si, 0.53 Ni, 0.50 Cr, 0.26 Mo); austenitizing temperature, 1500 deg.; Acl temperature, 1355 deg.; prior condition, as rolled.

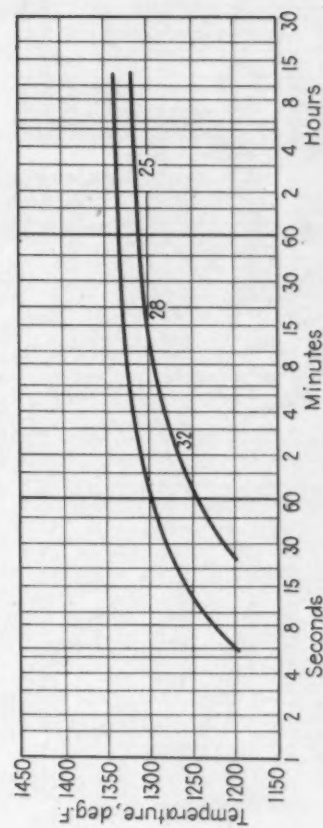
F IG. 28—0.85 C tool steel (0.23 Mn, 0.18 Si, 0.05 Ni, 0.07 Cr); austenitizing temperature, 1385 deg.; Acl temperature, 1370 deg.; prior condition, natural.



F IG. 29—1.16 C tool steel (0.27 Mn, 0.21 Si, 0.08 Ni, 0.11 Cr); austenitizing temperature, 1410 deg.; Acl temperature, 1370 deg.; prior condition, natural.



F IG. 30—SAE 52100 steel (1.04 C, 0.10 Ni, 0.35 Mn, 1.35 Cr, 0.33 Si); austenitizing temperature, 1400 deg.; Acl temperature, 1385 deg.; prior condition, tempered at 1350 deg. for 2 hr.



F IG. 31—Crucible Double Special (1.32 C, 0.28 Mn, 0.40 Si, 0.13 Ni, 0.22 Cr, 3.51 W); austenitizing temperature, 1550 deg.; Acl temperature, 1380 deg.; prior condition, natural.

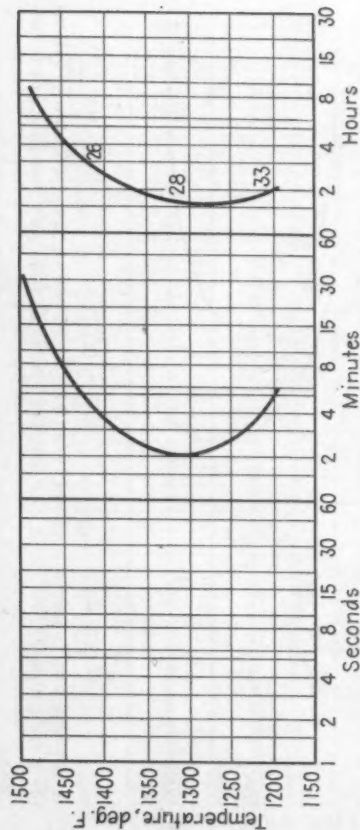


FIG. 32—8 Cr-8 W steel (0.54 C, 0.62 Mn, 0.93 Si, 7.83 Cr, 6.90 W); austenitizing temperature, 1050 deg.; Acl temperature, 1540 deg.; prior condition, natural.

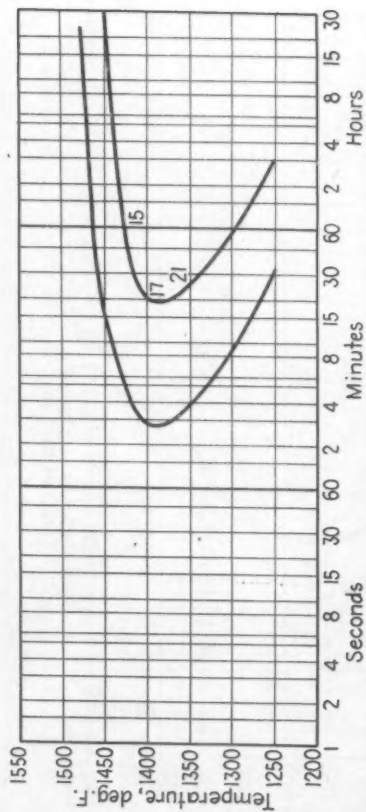


FIG. 33—Airdi 150 (1.50 C, 0.30 Mn, 0.36 Si, 11.00 Cr, 0.23 V, 0.74 Mo); austenitizing temperature, 1600 deg.; Acl temperature 1490 deg.; prior condition, tempered at 1450 deg. at 3 hr.

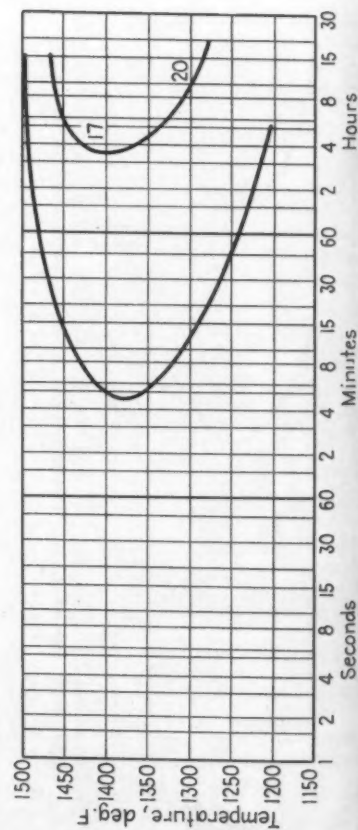


FIG. 34—Rex MM (0.82 C, 0.26 Mn, 0.28 Si, 4.14 Cr, 1.56 V, 5.59 W, 3.69 Mo); austenitizing temperature, 1625 deg.; Acl temperature 1520 deg.; prior condition, natural.

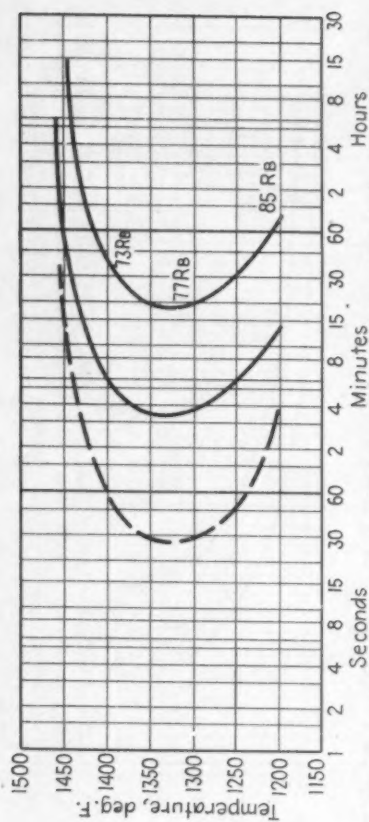


FIG. 36—Lo Cro 46Mo (0.06 C, 0.33 Mn, 0.20 Si, 5.04 Cr, 0.55 Mo); austenitizing temperature, 1650 deg.; Acl temperature, 1475 deg.; prior condition, tempered at 1400 deg. for 2 hr.

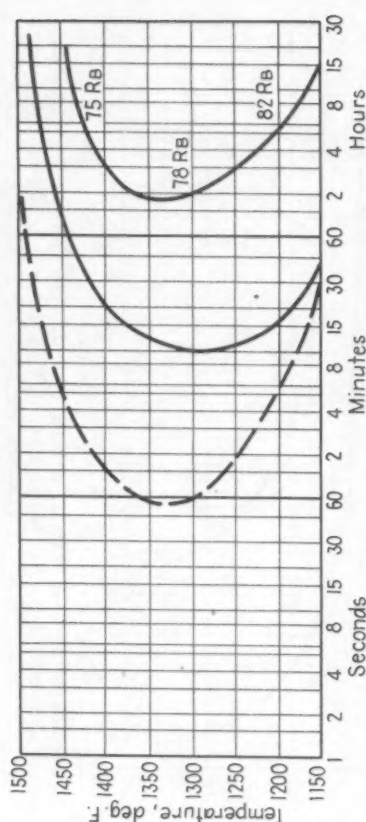


FIG. 37—Stainless 12 (0.09 C, 0.44 Mn, 0.27 Si, 12.60 Cr); austenitizing temperature, 1800 deg.; Acl temperature, 1490 deg.; prior condition, natural.

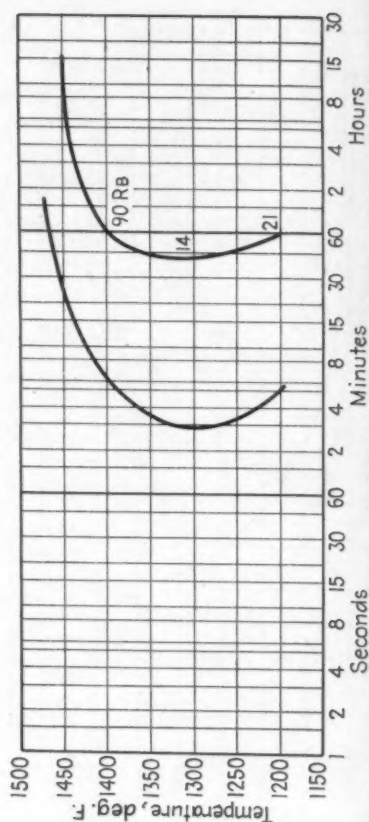


FIG. 38—Stainless A (0.36 C, 0.43 Mn, 0.49 Si, 0.24 Ni, 13.50 Cr); austenitizing temperature, 1800 deg.; Acl temperature, 1490 deg.; prior condition, tempered at 1350 deg. for 2 hr.

FIG. 38—Stainless A (0.36 C, 0.43 Mn, 0.49 Si, 0.24 Ni, 13.50 Cr); austenitizing temperature, 1490 deg.; prior condition, tempered at 1350 deg. for 2 hr.

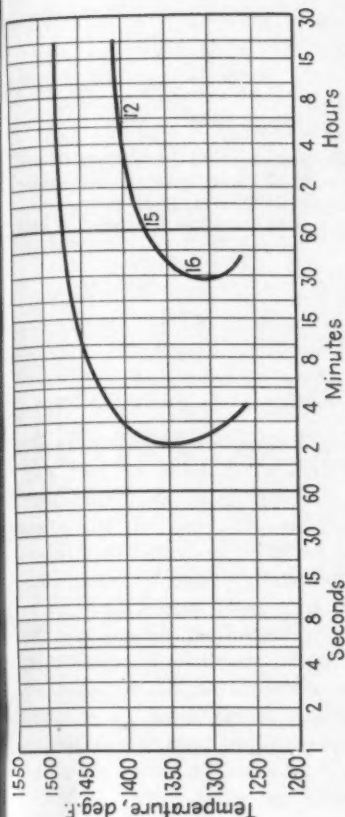


FIG. 39—Stainless B (0.62 C, 0.30 Mn, 0.17 Si, 16.59 Cr); austenitizing temperature, 1600 deg.; Acl temperature, 1490 deg.; prior condition, tempered at 1450 deg. for 3 hr.

FIG. 34—Rex MM (0.82 C, 0.26 Mn, 0.28 Si, 4.14 Cr, 1.56 V, 5.59 W, 3.49 Mo); austenitizing temperature, 1625 deg.; Acl temperature, 1520 deg.; prior condition, natural.

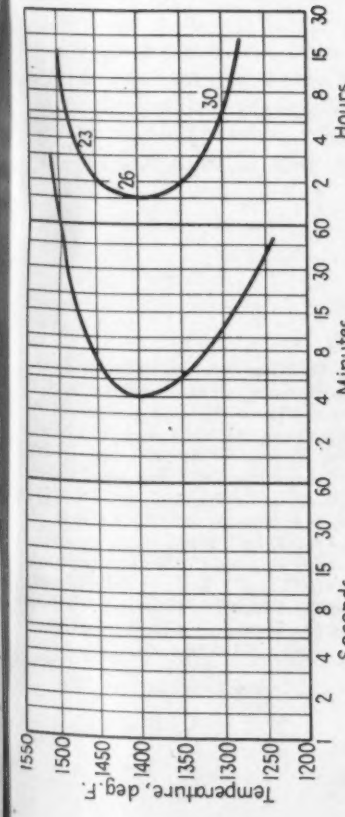
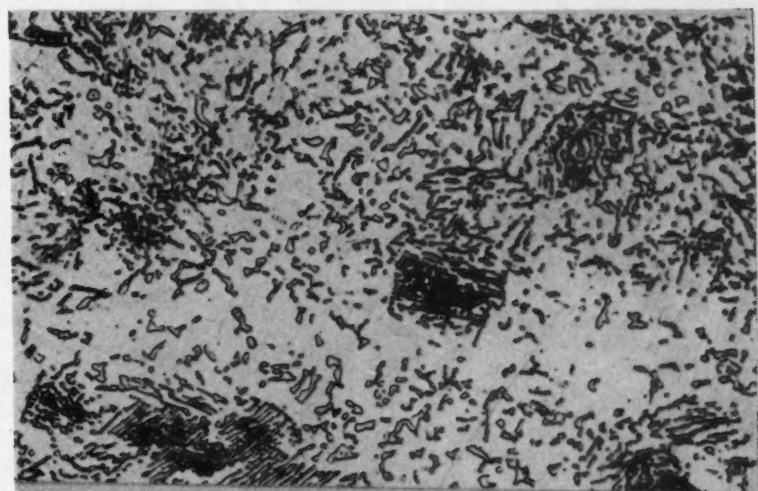
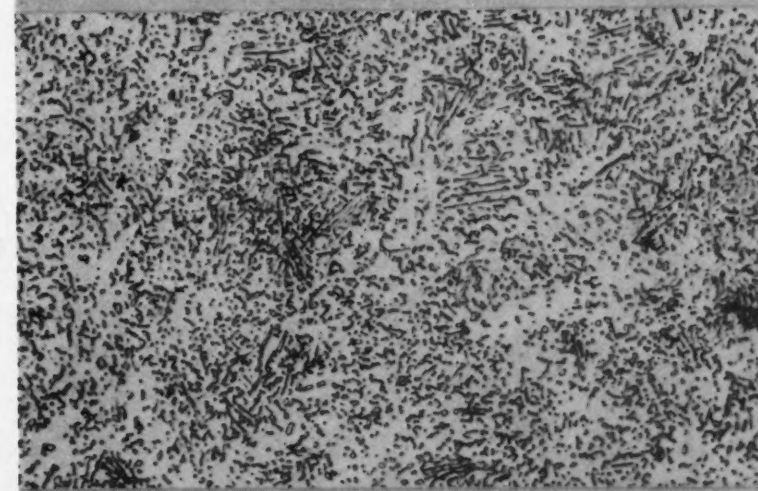


FIG. 35—Rex MMM (0.81 C, 0.41 Mn, 0.31 Si, 4.11 Cr, 1.51 V, 5.46 W, 4.27 Mo, 5.22 Co); austenitizing temperature, 1625 deg.; Acl temperature 1520 deg.; prior condition, natural.

41 A



41 B



41 C

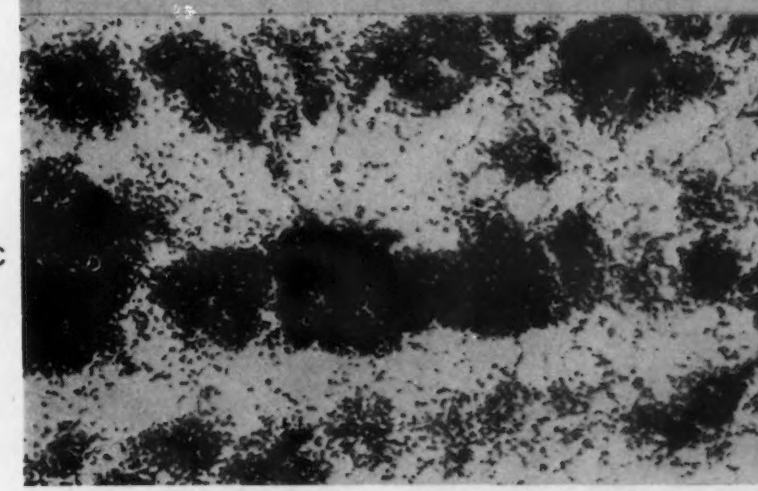


FIG. 41—Microstructures of some alloy constructional steels annealed by TTT methods. The sample shown in microphotograph 41a is A 2340 steel, austenitized for 2 hr. at 1360 deg. F., transformed by holding for 8 hr. at 1140 deg., for 2 hr. at 1110 deg. and for 1 hr. at 1030 deg. Brinell hardness is 192. Microphotograph 41b shows a sample of A 3240 steel, austenitized for 2 hr. at 1410 deg. F. and transformed by holding at 1260 deg. F. for 2 hr. Brinell hardness, 187. In microphotograph 41c is shown a sample of E 3315 steel, austenitized 1 hr. at 1450 deg. and transformed by holding for 8 hr. at 1100 deg. F. Brinell hardness, 192. Etched in picral; magnification 1000 diameters.

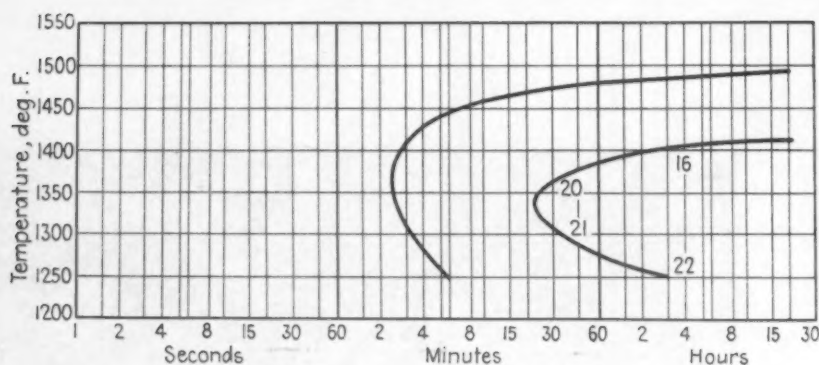
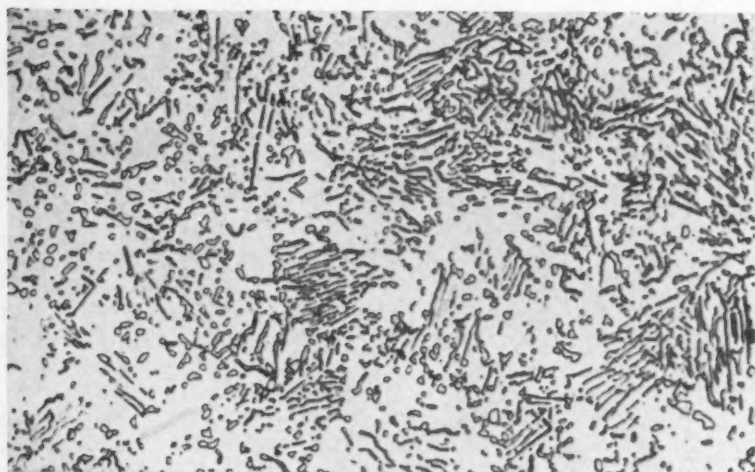
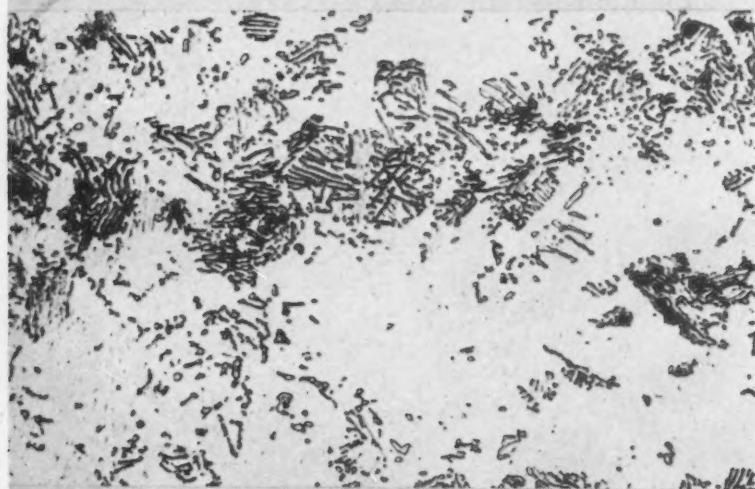


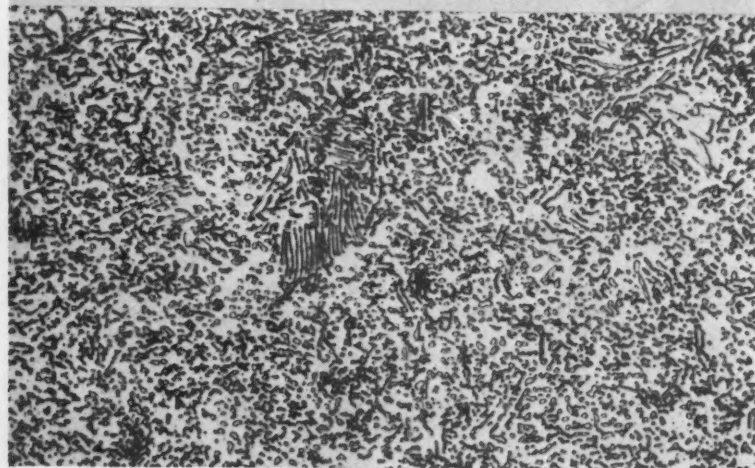
FIG. 40—Stainless BM (0.93 C, 0.49 Mn, 0.43 Si, 18.40 Cr, 0.55 Mo); austenitizing temperature, 1600 deg.; Acl temperature, 1500 deg.; prior condition, tempered at 1450 deg. for 2 hr.



42 A



42 B



42 C

FIG. 42—Additional microstructures of alloy constructional steels annealed by TTT methods. In 42a is shown a sample of A 4645, austenitized at 1370 deg. for 2 hr., transformed by holding at 1210 deg. for 12 hr. Brinell hardness, 187. The steel shown in 42b is A 3135, austenitized at 1410 deg. for 2 hr. and transformed by holding at 1250 deg. for 2 hr. Brinell hardness, 167. In 42c is shown an A 6145 steel, austenitized at 1430 deg. F. for 2 hr. and transformed by holding for 4 hr. at 1310 deg. F. Brinell hardness, 192. Etched in picral; magnification 1000 diameters.

Brinell. On the basis of these results the following cycle was recommended for the annealing of Rex AA to a hardness of 241 Brinell maximum: (1) Austenitize at 1650 deg.; (2) lower temperature to 1470 deg. as rapidly as convenient and hold at 1470 for 3 hr.; (3) lower temperature to 1450 deg. and hold at 1450 for 3 hr.; (4) cool in furnace to 1425 deg.; (5) finish cool in air.

Step (4) is not necessary except as a precaution to allow for irregularity in temperature regulation in mill furnaces of the batch type.

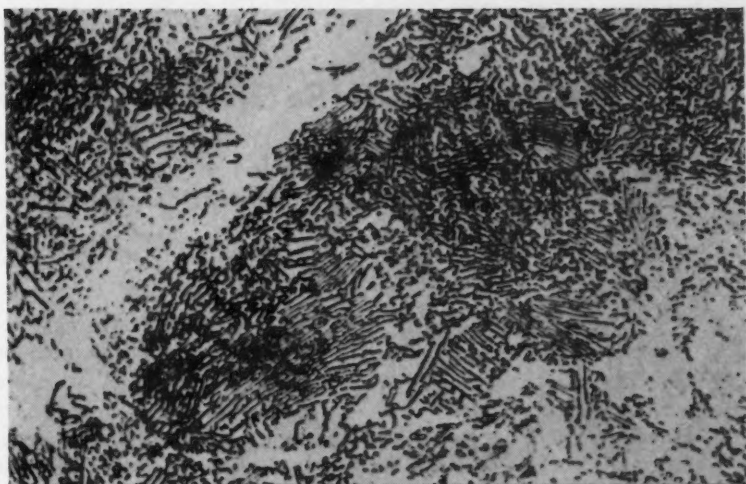
This experience demonstrates, first the need for studying more than one heat of steel before an annealing cycle is set up and, second, the use of compromise treatments rather than an ideal treatment for commercial annealing.

Actually, although a relatively short cycle could be set up for annealing this grade in a continuous furnace in which temperature regulation can be fairly accurate, there is no particular advantage in using isothermal procedures in the operation of batch type furnaces, since the regulation of temperatures within a large load of bars cannot be as accurate as is required. It is found more convenient to cool the load from about 1500 deg. to 1400 deg. at about 10 deg. to 15 deg. per hr., than to try to hold it at 1470 deg. for 3 hr. and then at 1450 deg. for 3 hr. However, although full advantage cannot be taken of constant temperature transformation in batch type annealing, the knowledge that the steel need not be cooled below about 1400 deg. has brought about a considerable saving of time in the annealing of Rex AA.

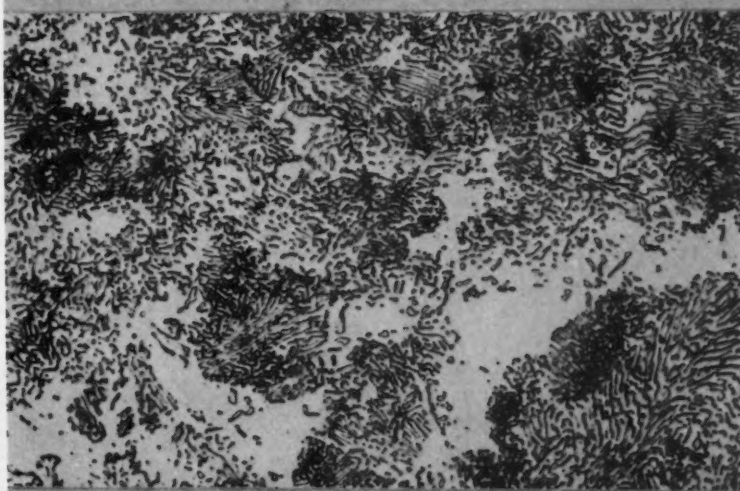
As further illustrations of annealing cycles based on TTT curves, Table I gives a few which were selected more or less at random. These apply to familiar alloy constructional steels and different compositions, some tool steels, and hardenable stainless steels. The basis on which the cycles were established was minimum time to produce structures which are of reasonable hardness, that is, around 200 Brinell. The structures obtained in the constructional steels are illustrated in Figs. 41, 42 and 43. To produce specific microstructures these cycles would have to be modified somewhat in accordance with Rule 1, as discussed more fully in Part V appearing next week.

Editor's Note: This article concludes with next week's installment.

43 A



43 B



43 C

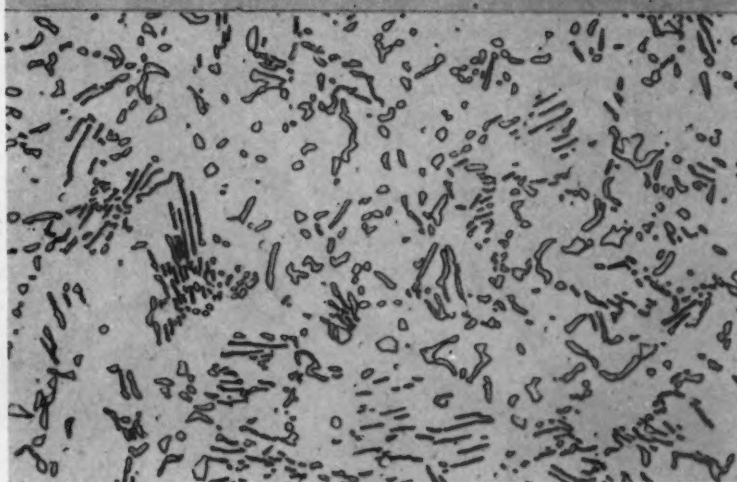


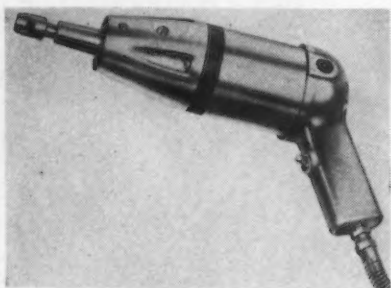
FIG. 43—Additional microstructures of alloy constructional steels, annealed by TTT methods. In 43a is shown a sample of A 4140 steel, austenitized at 1425 deg. for 2 hr. and transformed by holding at 1300 deg. F. for 2 hr. Brinell hardness, 170. The sample in 43b is E 4342 steel, austenitized at 1440 deg. for 2 hr. and transformed by holding at 1210 deg. for 8 hr. Brinell hardness, 192. In 43c is shown a sample of A 9255 steel, austenitized at 1440 deg. for 2 hr. and transformed by holding at 1360 deg. for 4 hr. Brinell hardness, 207. Etched in picral; magnification 1000 diameters.

New Equipment . . .

Small Tools and Gages

Description of improvements in power tools, fastening devices and inspection equipment continued from previous issue.

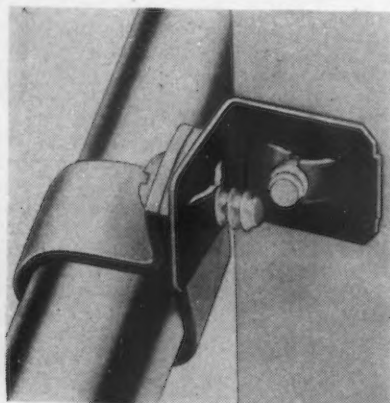
RETAINING the basic reciprocating (push-and-pull) principle of former models, a new portable electric tool has been announced by *H & H Research Co.*, 435 Marquette Building, Detroit. Model CX has a $\frac{3}{8}$ in.



stroke; Model EX has a $\frac{1}{2}$ in. stroke. Rate of stroke is 1000 to 1200 per min. for either model, with power of stroke a 30 to 40 lb. push or pull, developed at the working end. A pistol grip, equipped with a conveniently located finger control switch, is shaped for quick and easy handling. The large capacity fan, air inlets and air outlets provide an improved motor cooling system. Two models are offered, having different push-and-pull stroke lengths.

Conduit Fastener

THE fastening bracket developed by *Tinnerman Products Inc.*, 2040 Fulton Road, Cleveland, combines a



bracket and fastening means in a single stamping. It is claimed it also permits the use of standard bonding clamps in the assembly of conduit and piping in aircraft. One or more Speed Nuts are formed as an integral part of the bracket, thus reducing the number of parts. Adjustment of conduit or piping at any desired angle can be made with the use of an ordinary screwdriver.

Rivet Bucker

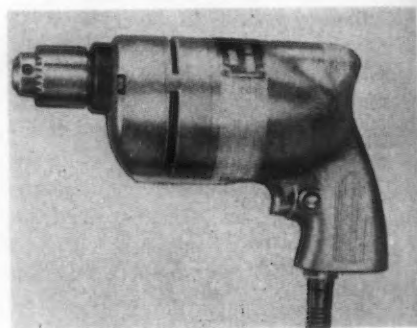
ABENCH model automatic rivet bucker that enables an operator to both buck and rivet in one operation is being produced by the *Aero*



Tool Co., Burbank, Cal. Using a standard rivet set that is synchronized with an air cushioned bucker, it is claimed the bucker is always perfectly aligned with the rivet set. Treadle control enables the operator to have both hands free. When the rivet set contacts the rivet, the bucking bar is always against the shank. No predetermined setting is required, even with varying lengths of rivets.

Heavy Duty Electric Drill

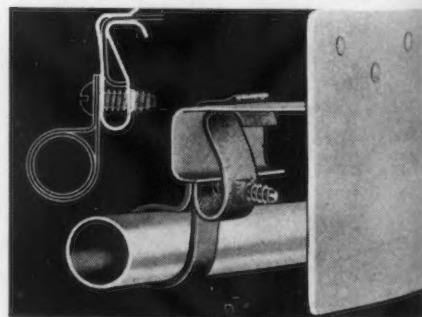
MODEL 47 Skildrill has been developed by *Skilsaw, Inc.*, 5033 Elston Avenue, Chicago, for production drilling jobs up to $\frac{1}{4}$ in. in steel



and $\frac{1}{2}$ in. in wood. Light and compact, the Skildrill has a diecast body, helical-cut gears and anti-friction bearings. Universal motors in 1800, 2500, 3500 and 5000 r.p.m. are available. Two-pole momentary contact switch with lock for continuous operation is provided.

Speed Nut

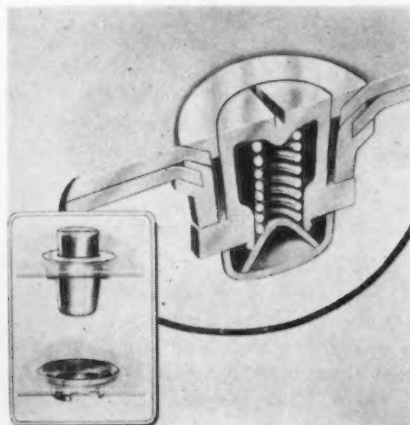
TINNERMAN PRODUCTS INC., 2040 Fulton Road, Cleveland, has developed a type of Speed Nut for rapid assembly of conduit, piping, and wire harnesses used in aircraft. Made of special aircraft spring steel with a zinc spray finish, it is designed to snap around rolled sections or stringers, eliminating drilling holes in the sections. As the screw is tightened in the nut, its two legs are forced in-



ward to give a firm spring tension grip. A similar product is made for beaded extrusions.

Aircraft Parts Fastener

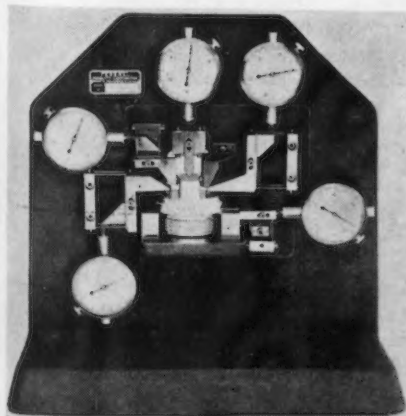
A FASTENER for aircraft' cowlings, inspection plates, protective panels and similar uses has been developed by the *Simmons Machine Tool Corp.*, 1000 North Broadway, Al-



bany, N. Y., which is known as the Simlock. A helical-type spring gives long spring travel, thus reducing vibration. In tension the load is carried by hardened steel lugs. The stud is self-ejecting when it is unlocked, and the stud part is locked semi-permanently in the outer sheet. It is claimed the Simlock fastener is self-aligning after the first installation; no vibration occurs when it is in the unlocked position; its taper design allows ample clearance for the assembly of cowlings and deflection is held to a minimum.

Multiple Inspection Gage

MODEL 247 B-76, offered by *Federal Products Co.*, 1144 Eddy Street, Providence, has been designed to check, in one operation, five separate dimensions on a fuse body. Gage stands upright so that the dials will face the operator as he sits at his



bench. The gage first must be set to a master. Part is positioned by three supporting blocks. The movement of each sensitive contact is transmitted directly to each dial indicator point through a pantograph unit. This feature prevents the dial indicator points from becoming worn or otherwise damaged by constant contact with the pieces being gaged.

Checking Recorder

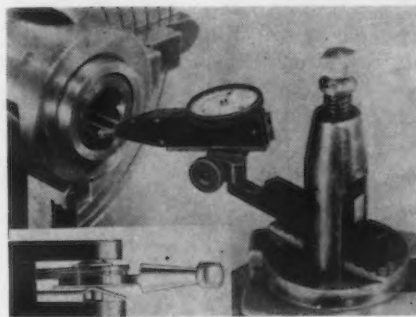
DESIGNED for use with Michigan Sine-Line lead and involute checkers, an automatic checking recorder, designated as the Model B, is being offered by *Michigan Tool Co.*, 7171 East McNichols Road, Detroit, which makes permanent chart records of involute tooth form and lead errors.



Operation of the recorder is based upon the use of synchronous devices. One is located in the recorder and another installed on a bracket in the base of the gear checker. Any motion imparted to the checker is automatically and accurately multiplied and duplicated in the recorder through electrical connections between the two units. The chart drive may either be coupled in synchronism with the moving spindle or table of the measuring device, or it may be driven independently by means of a separate synchronous motor at predetermined speeds.

Test Indicator

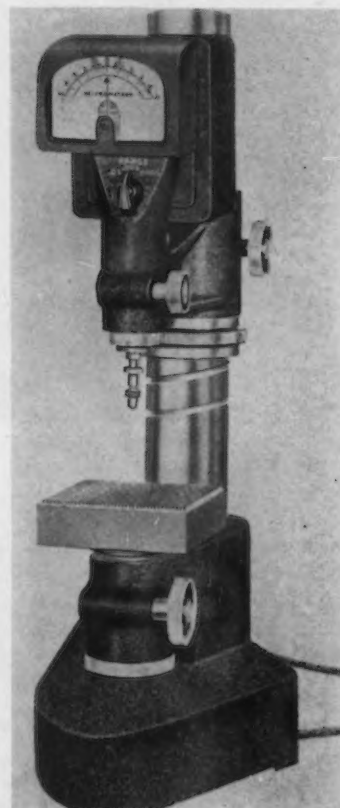
FEDERAL PRODUCTS CORP., 1144 Eddy Street, Providence, is introducing the Testmaster, a dial indicator which is claimed to be very



adaptable. The movement is a simple, direct combination of lever and crown gear. A hairspring takes up all backlash on gears, and setting is made easy by the dovetail slides located on the bottom edge and back end, and the universal clamp. The new index point with ratchet locks in place, but can be removed for replacement at any time. Point can be set at any angle and its direction of operation reversed. Four models of dials can be furnished, with graduations to 0.001 and 0.0001 in. and 0.005 and 0.01 mm.

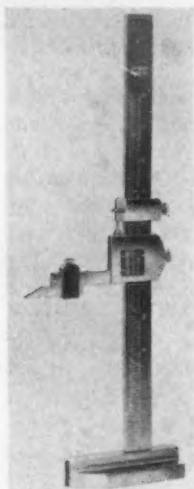
Electronic Gage

THE Model 11 Micrometer, offered by *Televiso Products, Inc.*, 6533 North Olmsted Avenue, Chicago, is a triple purpose instrument with ranges of ± 0.05 , 0.005, or 0.0005 in. To operate, a standard workpiece is inserted under the feeler point and the unit is positioned to read zero. The



test pieces are then inserted in place of the standard and the differences are indicated on the scale, which covers an arc of 4 in. The unit is operated from 105 to 120 volt, 60 cycle power supply.

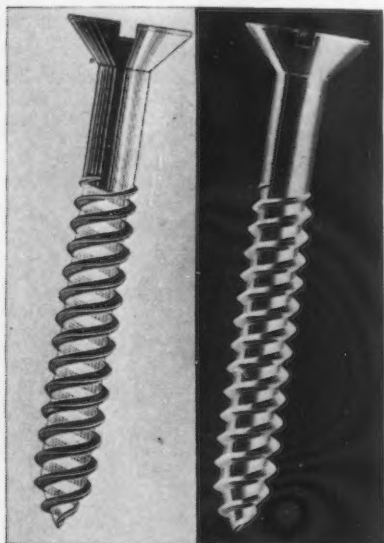
Vernier Height Gage



A VERNIER height gage in three standard sizes, 12, 18, and 24 in., is announced by the *Jansson Gage Co.*, 19208 Glendale Avenue, Detroit. It is designed especially for use in jig and fixture making and for general layout and inspection work.

Twin Thread Screw

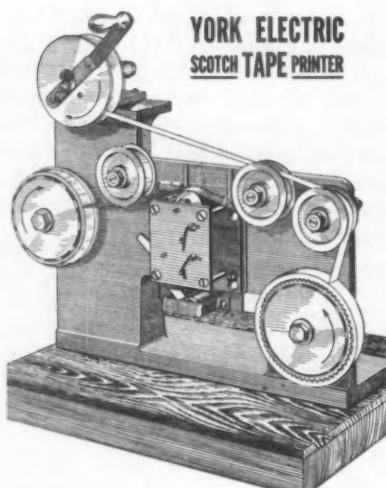
THE Twin-Fast screw for wood, plastic, and combination assemblies has been introduced by the *Blake and Johnson Co.*, Waterville, Conn.



Two parallel threads which start at opposite sides of the shank terminate in a single, centered point. It is claimed the twin-thread construction doubles driving speed, yet the driving torque is only nominal, since the standard number threads per in. are provided. The screw is cylindrical in contour, not tapered, and is self-tapping.

Scotch Tape Printer

A MACHINE designed to print standard Scotch tape in a man-



YORK ELECTRIC
SCOTCH TAPE PRINTER

ner which makes it impervious to gasoline and oil is being manufactured by the *York Electric & Machine Co.*, 1241 West King Street, York, Pa. The printing is done on the under or sticky side of the tape, which is then backed up with an opaque tape. As a result, the printing ink is hermetically sealed between transparent and opaque tapes and cannot be erased or destroyed. Interchangeable type and numeral wheels permit unlimited alphabet or digit combinations.

Glass Gages

THE TURNER GAUGE GRINDING CO., Ferndale, Mich., has recently added the production of glass gages to its line of precision built gages, which range in size from $\frac{3}{8}$ to $2\frac{1}{4}$ in. in diameter. Advantages claimed are: they are not subject to corrosion; they afford visibility in inspection; and scratches and slight chipping on glass neither burrs gages



nor changes their gaging functions. The glass gages are made to the same tolerances as steel gages.

Plastic Grip for Toggle Clamps

A GRIP to be fitted over the handles of toggle clamps is made of heavy extruded plastic which has the appearance and physical properties of rubber, and is claimed not to be affected by oil or grease. This device, made by the *Detroit Stamping Co.*, is said to provide a positive hand hold, plush cushioned protection for the operator's hands in both locking and releasing, regardless of whether handle is pushed over or "kicked" over.

Toggle Clamp

A SMALL, light duty clamp, which is said to be especially suitable for use in aircraft construction or on work where clamping space is limited, has been developed by *Detroit*



Stamping Co., 345 Midland Avenue, Detroit. The clamp measures only $5\frac{1}{2}$ in. in height overall, with a base $1\frac{3}{8}$ x $1\frac{1}{4}$ in. The length of bar from handle to tip is $2\frac{1}{4}$ in. Made in two styles, Model 207S has a solid straight bar, and Model 207U has a U-shaped bar.

Saw Lubricant

COMPOUNDED to withstand extreme pressures, minimize scoring and heating of the saw and to produce a smoother cut, "Saw Eez" is a product of the *Doall Co.*, Des Plaines, Ill. It may also be used as a lubricant on lathe centers, hack saws, circular saws and other bearing surfaces which require intermittent applications of a tough film lubricant.

"It's easy to handle

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New workers appreciate the simplicity of Exide Maintenance

INDUSTRIAL RECRUITS, like their more experienced fellows, are learning about the compact efficiency found in Exide Ironclad Batteries. Rugged construction and easy maintenance are important features of an Exide Ironclad. They shorten the training periods of new workers and help deliver surging power for a real War of Movement on the Home Front.

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- Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
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 - Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
 - Record water additions, voltage and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.
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EASY MAINTENANCE, SAVES LABOR: Exides are kept charged by the simplest method ever devised. With the Exide Charge Control Unit there's nothing to do but connect the battery to the charging source and turn a knob.

Assembly Line . . .

STANLEY H. BRAMS

• Auto dealers begin post-war studies, in fear that surpluses of Army goods may kill their business . . . Alcoa fastens eye on post-war markets . . . New "cold welding" is demonstrated.



DETROIT — Automobile retailers have become the latest joiners of that intangible movement which might be called the Post-war Study Club. The National Automobile Dealers Association has set up a post-war planning committee.

In one respect the worries of the retail dealers have considerable bearing on the post-war production planning of the auto manufacturers. This is in respect to disposition of military surpluses of automotive parts and equipment.

Estimates have been that all military surpluses at the end of the war will be in excess of \$50,000,000,000. So far as the automotive dealers are concerned, their interest lies chiefly in the residue of parts for military vehicles and automotive engines and usable, disposable vehicles. It would appear likely, on snap estimate, that perhaps half a billion dollars would be represented in truck and engine replacement parts which could readily be used in civilian channels, and perhaps the same amount in cars and trucks.

The natural viewpoint of the dealers is that these supplies should not be dumped on the retail market through Army stores, as at the end of the last war, or other such means. In this viewpoint they have the heartfelt backing of the supplier branch of the automotive industry itself, for whom a half-billion dollar parts sur-

plus hanging over the market would be a dark cloud indeed.

But after development of this mutually acceptable feeling, the thinking of the dealers and the factories parts company. The dealers would like to see such surplus materials sold through "regularly established channels," which means that their preference would be to buy the equipment from the government at regular wholesale prices or less and then resell it as demand develops. In so far as the factories are concerned, such a program would have the same effect as dumping, for it would clog up their retail distribution channels.

But the parts and accessories makers have no alternative proposal and realize they probably will be adversely affected by any action short of tossing parts surpluses into the depths of the Atlantic Ocean, a move which would evoke no cheering among the taxpayers. As a matter of fact, there is no real and full solution for this problem when it ultimately will face the producers.

The only possible alternate is the development of brand new units to sell, units which will require new parts with new specifications. But that decision will be up to the automobile companies rather than their suppliers, and there is little expectation that the auto companies will undergo extensive retooling programs for two to five years after the war.

ONE more thought may be added in this connection. Extensive changes in automotive conception have never come in the past while business has been good. The automotive companies, logically enough, have gone along selling virtually unchanged wares as long as there was ready acceptance for them. Not until demand falls off, as in the bottom of the depression, have really new ideas begun to come into the automotive picture.

When the war ends, there will be a frenzied rush to get cars into the field; 1942-type models will be offered. Thereafter, there will likely be a heavy volume of sustained demand, developed during the production curtailment period of the war. So long as this demand continues, it would be unlikely that the automotive industry would strain itself to produce the new types of cars as promised by the Sunday supplement sections and other such daydreamy writing.

On the subject of post-war markets, Detroit business men have recently had their thinking prodded by a series of meetings sponsored by the Board of Commerce, one of which developed an intense discussion of just how big the post-war market would be and what factors would interplay in it.

In the first place, the broad question was raised whether we will enter an inflationary or deflationary era after the war. Despite fears that inflation is arriving right now, some sober thinking is that we will be not entirely exposed to it until after the war, when the citizen starts to cash his war bonds and begins to look around for consumer goods to buy with proceeds. Accompanying such moves will be hurried factory efforts to reconvert, but civilian goods output will not match demand and the spending power backing up that demand. This is, of course, an ideal inflationary set-up. Its force can conceivably be much more potent after the war than today, when bond purchasing is becoming more and more intensively recommended.

Then, should inflation prevail after the war, the purchasing power of saved dollars, rapidly thinned out, will sap the post-war consumer goods market. Today's housewife who takes to the grocery store a dollar saved five years ago gets little for her already-depreciated money. The head of the house who buys bonds today in hope of getting an automobile tomorrow will have an identical experience if his \$1000 savings proves little more than a good-sized down payment at higher post-war prices—but that can happen, too, if we move into post-war inflation.

From another standpoint, the size of a post-war market will be materially influenced by the speed with which reconversion is accomplished. Take the automobile industry as an example. It has approximately 1,250,000 men and women working in its major and subsidiary plants today. When the war ends, the overwhelming bulk of these will be cut off payrolls immediately, and it will be at least a few months before tooling can be completed for passenger car and civilian truck production. After the conversion is complete, no more than 750,000 employees are likely to be called back to their jobs. The savings of the other half million may be depleted to the vanishing point until

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they get jobs, and the savings of the 750,000 returned to work will have suffered necessary diminishment during changeover period unemployment. As the reconversion period of idleness may enlarge, so will war savings diminish. A slow reconversion could well explode the post-war market entirely for the automotive industry, and the rest of the nation, employers and employees alike, faces the identical situation.

THAT the Aluminum Co. of America has an eye on the post-war automobile market is well indicated by the studies made by that company. For instance, fairly complete analysis has been made of the weight-saving advantages accruing through the use of aluminum in place of steel or iron.

Powerplant assemblies can be reduced by an average of 225 lb. by the use of aluminum cylinder block crank cases, cylinder head piston rods, pistons, intake manifold transmission case and covers, it was said in a recent talk by Frank Jardine of Alcoa. Average car doors could be reduced in weight approximately 30 lb. per door, bumpers 40 lb., miscellaneous hardware 18 lb., rear deck 18 lb., hood assembly 34 lb., wheels 45 lb., shock absorbers 5 lb. each, and other savings were also listed.

Over-all indications are that approximately 500 lb. of aluminum parts could be installed in an automobile in places where the light metal is not now generally used, of which 200 lb. would be secondary alloy castings, 15 lb. primary castings, 20 lb. forgings, 20 lb. die castings and 270 lb. stampings.

Finished secondary alloy castings, Jardine said, would probably be competitive pricewise with the metals they replace, provided the quantities of the materials used are comparable with the quantities of cast iron employed in pre-war automobiles. He said that stampings, forgings and primary castings would be higher in cost, however, than conventional parts now used.

At the same time, it was pointed out in the talk that the only way the automobile manufacturers could meet previous cost standards in utilizing large production runs of aluminum, would be to make their own castings in their own foundries. Nevertheless, he stated, "there is no aluminum foundry in this country with capacity to make aluminum castings for 1000 powerplants per day." He reported that the largest aluminum foundry in

Ford Nears Peak on A.A. Gun Directors

Detroit

• • • Production schedules on Army anti-aircraft gun directors will soon be reached by Ford Motor Co. The units are usable not only against enemy aircraft but against ground batteries or any point located by a sight.

Extreme problems in production are involved in the job, which includes more than 12,000 parts per unit. Even on a production basis, many parts must be checked individually.

Ford engineers have developed a number of speedier and more efficient production methods which are being installed at the factory, and some of which have been adopted by the original manufacturers. Manufacture is in a specially prepared building, one floor of which is equipped with heavy, tight fitting steel elevator doors to exclude dirt and dust. A temperature-controlled room was specially equipped where the directors are adjusted for sighting control devices. Women employees in this room may not wear nail polish nor long nails; their hair must be covered; and wraps must be left elsewhere.

operation today was capable of producing only 100,000 lb. of miscellaneous automobile castings—a third or so of the requirements for 1000 powerplants daily.

To meet the Jardine thesis, therefore, automobile companies would have to enlarge such aluminum foundry operations as now exist, and would depend on outside foundries only for job runs. This runs counter to the general attitude of the industry, which depends on outside foundries for a large variety of its production requirements.

REPAIRING of cracked and damaged cylinder blocks and heads by mechanical means appears to work out fairly successfully under a new "K & W mechanical method" recommended by the Office of Defense Transportation and outlined extensively in recent bulletins of the Society of Automotive Engineers. The method is developed and licensed by Kerkling & Co., Inc., Bloomington, Ind.

In essence, a crack is actually laced together, rather than welded. Crack progression is first stopped by drilling a hole at its lower end. Holes are

then tapped along the crack, pins being inserted into the holes. Protruding ends of the pins are cut off leaving a small overhang for cleaning and finishing. Surplus metal is ground off and the surfaces polished smooth. The insertion of the pins has the effect of bringing the crack to dead ends in either direction, and the circulating of a mechanical seal through the engine following completion of the so-called "cold welding" of the metal adds a final touch of security.

Extensive savings in money, equipment and time appear achieved by the use of this method rather than more orthodox means. The procedure has been demonstrated throughout the country under the auspices of ODT.

Added Control Placed On More Heat Exchangers

Washington

• • • Additional types of heat exchangers were brought under strict control by WPB last week in an action designed to channel critical types and sizes into essential war industry and military use. A revised order L-172 broadens the coverage to include additional types and sizes but makes a distinction between the most critical types and others by requiring specific authorization by WPB before an order can be placed with a manufacturer for certain heat exchangers.

Applications for such authorization must be made on Form WPB-1475. In the case of all other heat exchangers specific authorization is not required prior to the placement of orders, but the orders must bear a preference rating of AA-5 or higher.

ICC Denies Higher Rates On Iron and Steel Shipments

Washington

• • • The Interstate Commerce Commission last Friday denied and cancelled a proposed higher freight rate for transportation of iron and steel products, including tinplate and terne plate, of East, West and Southern origin, in carloads to Pacific Coast points for export.

The ICC stated that the carriers had not attempted to show that present export rates were not compensatory or that the proposed increases were necessary from a revenue standpoint.

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IN ANY GAGE, surface finish is of vital importance. Without the extremely smooth surfaces characteristic of the best gages, sliding friction produced with gage use soon wears away the microscopic irregularities which project from the solid metal. This wear soon results in a change in gage size, and the gage is of no further use for its particular inspection purpose.

At Lincoln Park, careful control in grinding and lapping produces gages with extremely high finish. A large department, operated under ideal working conditions and staffed with highly skilled men and women, is devoted to lapping operations alone. Here Lincoln Park Class XX and X gages are finished with Profilometer readings no greater than 1.5 microinches. Readings no greater than 2.5 microinches are guaranteed on Class Y gages.

Lincoln Park Finishes Measured in FRACTIONS of A Microinch

No smaller measurements can be made of surface roughness than those which are secured in the Lincoln Park plant. In constant use is a special Profilometer which incorporates an extra step in its range of sensitivity. It is adapted to the measurement of surfaces three times as smooth as those which can be measured by the standard instrument. Many of the finishes produced by Lincoln Park require this extremely accurate inspection.



LINCOLN PARK TOOL and GAGE CO.

LINCOLN PARK, MICHIGAN



• Unions apathetic to government ownership of business threat . . . Government vs. private ownership a New Deal quarrel . . . Alcoa on list for post-war purging.

WASHINGTON—Private ownership of business is not a foreign idea to Americans. Government ownership is.

Strangely, though, it does not seem that the idea of government in business is recognized as collectivist propaganda, having no root in American or English tradition. Government ownership ideas are straight imports from foreign countries whose economic philosophy is diametrically opposed to that of the United States.

A large portion of the public seemed apathetic to the danger proposed by the National Resources Planning Board when it spoke for a large segment of New Deal visionaries and recommended that government guarantee production and employment. The board suggested a post-war "TVA" in pig iron, aluminum and magnesium, and all "basic" metals and industries.

While the reaction of Congress was immediate in cutting off NRPB funds, and the condemnation in the press was quick, there are still sizable segments of the public who apparently think that the NRPB recommendations are gospel. Labor unions are among these. They do not appear to realize that their existence is tied up with the profit motive and that government-owned plants will not enter into collective bargaining agreements.

Recently, the CIO-United Automobile Workers meeting in Canada adopted this policy. The International Executive Board said that govern-

ment should take over all monopolistic industries and those industries strategically necessary to national safety.

Said R. J. Thomas, UAW-CIO Chief: "Our industries can no longer be operated to serve private interests where those interests conflict with the public need. Initiative can find its most useful outlet, greatest recognition and highest reward when exerted in the public service." Much less startling would have been a suggestion that UAW dissolve. In collectivist or government ownership countries there are no labor unions. There is no free labor. The state is the sole employer.

THE union movement is the product of free enterprise and private initiative. Nowhere else in the world has unionism risen to such power and prestige as in America where a man can choose his employer and has the opportunity to become an employer himself.

Perhaps, though, Mr. Thomas and many others who think as he does, believe that organized labor will become the government through seizing the present emergency to change the United States from a republic to some form of socialist state. If so, the proposed larceny of billions of

dollars worth of both privately and governmentally owned plants for the benefit of the leaders of organized labor who have become drunk with power because of their authority in the present government, should be dragged into the open.

The day government takes over business in this country, on that day the rank and file of labor will be deprived of its right to organize and will be subjected to the paternalistic rule of bureaucrats who will be no less rapacious because they once bore a union label. No less defrauded will be the general public who will have to pay taxes to maintain the wasteful extravagance of government ownership. Inefficient operation has been government's business reputation from time immemorial.

THE expropriation of business is no idle threat. Today the federal government is the largest manufacturer in the world. Government officials boast that there will be no turning back of plants for 5c on the dollar as in the last war when this war is over. There is too much money invested, they say, and the plants cannot be allowed to fall into disuse and decay.

Evidence that government vs. pri-

TEXAS RUBBER: A sample of the first synthetic rubber produced in the Goodyear Tire & Rubber Co. plant in Houston, Texas, was presented to Secretary of Commerce Jesse Jones by Earl L. Mefford, left, assistant to vice-president of the company. Looking on is Sam Husbands, president of Defense Plant Corp.

Harris and Ewing Photo





**MAKES 5 TOOLS
LAST AS LONG AS 6**

SUNICUT

Increases Tool Life 20% . . . Produces Better Finish

Prolonging the useful life of tools has become a war-time duty as well as "good business" . . . and a major factor in determining tool life is the cutting lubricant. Many metal working shops have discovered that SUNICUT, the clear, free-flowing oil, not only improves the finish and decreases costs . . . but also adds valuable hours to the life of cutting tools.

In one large New England plant, engaged in vital war production, a change to SUNICUT on their multiple-spindle, automatic screw-machines resulted in an increase of 20% in tool life — helped them get as much work out of every five tools as they previously

obtained from six. They secured an average run of 8 hours between tool grindings. Down-time was reduced . . . production was increased . . . and the finish was greatly improved.

Such results, and even better, are not uncommon for plants which have switched to SUNICUT . . . the transparent, sulphurized cutting oil with exceptionally high metal-wetting and heat-absorbing qualities. For proof of what SUNICUT can do in your shop call in a SUN Oil Engineer. Write . . . **SUN OIL COMPANY • Philadelphia**

Sun Oil Company, Limited, Toronto, Canada



SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

vate ownership is a subject of quarrels in the New Deal is the current feud between Vice-President Wallace and RFC Chairman Jones. Mr. Jones has charged Mr. Wallace with seeking to further his "post-war ideologies" in his criticism of RFC. Everyone knows what Mr. Wallace favors with respect to government ownership and has been acquainted with his desire to liquidate the United States through a florid sentimental internationalism. Mr. Jones implied that he is battling for private ownership, but the Defense Plant Corp., an RFC subsidiary, perhaps is not aware of this.

DPC and other RFC subsidiaries have lent billions to industry for the war. When a company borrows money from RFC to build a war plant, the company usually gets an option to purchase the plant within five years. But DPC has been withholding this clause deliberately from the contracts of certain of the large industries which the New Deal has on its list for purging.

THE Aluminum Co. of America is a prime target. The government has reaped the benefit of that company's productive ability in the aluminum industry and has gotten it

to construct 40 plants at a cost of \$500,000,000. The government owns these plants, and Alcoa is leasing them, having contributed the engineering brains and the technical know-how. Alcoa has not been given any right to purchase them.

According to George R. Gibbons, Alcoa's senior vice-president, who testified before the House Naval Affairs Committee recently, the government-owned plants will have a capacity of 1,200,000,000 lb. at the end of 1943. Alcoa's plants will produce only 850,000,000 lb. of crude aluminum at the year's end. Thus, the government will own outright 60 per cent of a 2,000,000,000 lb. aluminum industry.

Alcoa's record in the war has been excellent. The fact is that it was foresighted enough to start expansion as early as 1938. Alcoa has spent more than any one company in plant expansion for war use, some \$250,000,000. And while Alcoa was giving anyone the right to use its patents and processes and becoming so to speak "pallbearer at its own funeral" through the construction of the government owned plants, the government was hell-raising about the "aluminum trust."

The country needed 10,000,000 tons of aluminum for the aircraft industry

and other war uses. The government knew where to go to get it. The government did not seize the processes and seek the aid of the leaders of organized labor to get the tonnage to whip the Axis. It did not hire thousands of bureaucrats to make regulations about aluminum to get aluminum production, or speechmakers to make ballyhoo about aluminum to get aluminum production. The government wanted to win the war and it had to have aluminum so it got Alcoa to contribute its 55 years of experience in the industry. The result is that the United States will make 85,000 planes this year.

NOT only did Alcoa release its processes in the United States, but it also did this in Great Britain. Alcoa did not charge the government any engineering fee for the construction of the huge plants, and it also went into the plants of competitors, or invited them to Alcoa's plants, to get the information and techniques for the production of aluminum for war. In 1942 Alcoa, through renegotiation, returned \$76,000,000 of excess profits.

This cannot be the record of "selfish recalcitrant" big business. No one can deny when the war is won, a great part of the credit for its winning should go to this industrial giant which the little men of the New Deal wish to cripple or slay.

Alcoa's record is paralleled by that of the steel industry and all of the other metal-working industries and the automobile and aircraft industries. Without them, and without the engineering and financial ability which built them, the United States could not wage a modern war.

As for serving selfish interests, the management of these companies serves millions of investors large and small, who are stockholders in them. Also these companies serve the monied interests of a majority of the whole people whose lives are insured by companies whose investments are based on industrial stocks. Every citizen has an interest in them because the very finances of government are based on the financial health of industry.

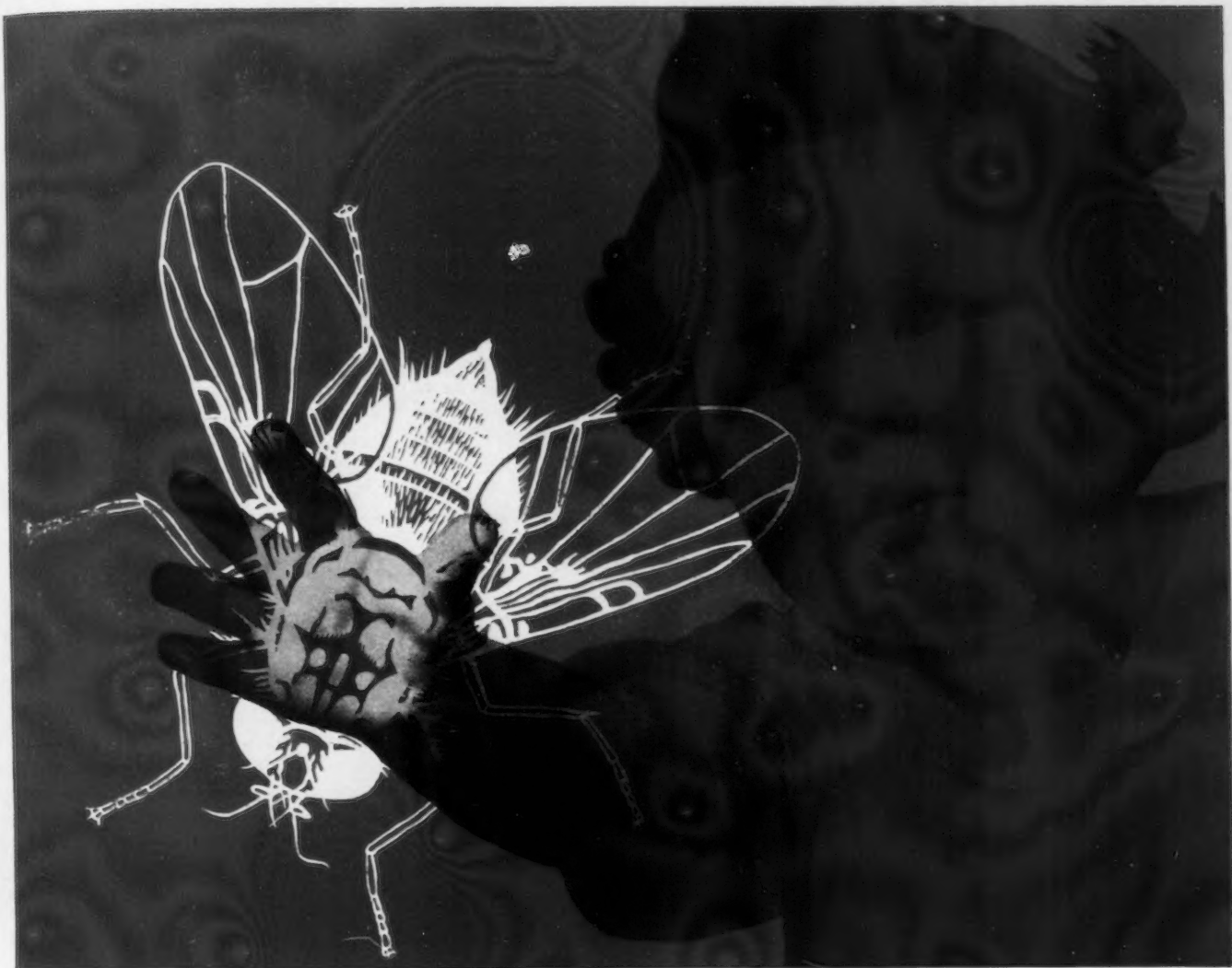
Export Shipments Increase

• • • In the first half of this year 603,313 cars of export freight, other than grain, were unloaded at Atlantic, Gulf and Pacific ports, compared with 417,370 in the similar period of last year, according to the Association of American Railroads.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





Your child's best friend...

THE PARASITIC FRUIT FLY, *Drosophila*, is perhaps the most important creature in the world to scientists today. Because its study may reveal what the character of our own children may be in the future.

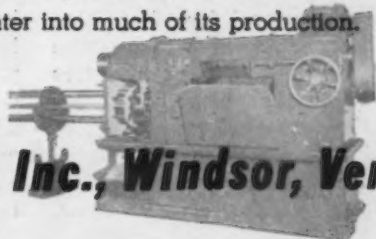
Drosophila is a perfect specimen for laboratory study, because a generation flickers past in from 8 to 12 days. As a result, scientists have been able to study and record a million breedings! And the entire mechanism of heredity has thus been revealed!

But if *Drosophila* is a friend to mankind, consider the influence of machine tools on human welfare. Do you know why it is that some countries, so rich in natural resources, still harbor hundreds of millions living close to starvation? And why the highly indus-

trialized countries represent the greatest advance in civilization? The answer is machine tools!

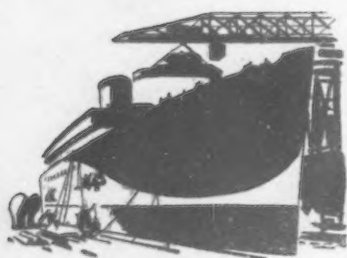
Machine tools have vastly increased the output of manufacturers and have shortened the customary hours of labor. They have **not** reduced the number of persons required to do the world's work. They **have** eliminated much of the back-breaking labor which would otherwise be required.

Cone Automatic Machine Company is proud to be a part of such an essential industry. Proud, also, to know that whatever we Americans build for the future, Cone Multiple Spindle Automatic Lathes will most certainly enter into much of its production.



CONE Automatic Machine Company, Inc., Windsor, Vermont

• **Kaiser shipbuilding manhours now less than half of Maritime Commission par . . . Unexpected Fontana demand tips Southern California scrap scales . . . California durable goods workers now 22.3 per cent women.**



SAN FRANCISCO—When Admiral Howard Vickery of the Maritime Commission elbowed his way into the controversy before a Congressional investigating committee, to support the Kaiser shipyards, he was not under the hypnotic spell of industrial braggarts for the picture magazines nor of engaging personalities in the Kaiser hierarchy. Richmond Shipyards Nos. 1 and 2—the Liberty ship yards—get by on figures as well as any strip teasers. In June, 51.7 per cent of all United States merchant shipping tonnage was built on the Pacific Coast. One-half of this coast's production was in the San Francisco Bay area. From Richmond Yards Nos. 1 and 2, which Kaiser operates for the Maritime Commission, was delivered one-sixth of all United States production of merchant shipping tonnage during the month.

Charges that these yards are overmanned can be met like this: When the original Liberty ship contracts were let, starting in December, 1940, the Maritime Commission estimated that 510,000 direct manhours per vessel would constitute par for efficient construction. Incentives were offered to the contractors for decreasing direct manhours from 510,000 down to 450,000 per vessel. The contractors participate to the extent of 40 per cent of the savings down to 450,000 manhours. No incentive was offered to decrease manhours below 450,000. At the Richmond Yards Nos. 1 and 2,

the number of manhours per vessel has decreased consistently, until in May it stood at 302,000 manhours, and in June 246,000 manhours. The trend is still downward, following a logarithmic curve of familiarity, as in aircraft production. The June record, 246,000 manhours, is less than half of what the Maritime Commission considered a normal requirement two and a half years ago. The record of Oregon Shipbuilding Corp., the Kaiser Liberty ship yard in the Portland area, is even slightly better. California Shipbuilding Corp., Los Angeles harbor, only a distant relative in the Kaiser family, is slightly higher. Cal-Ship leads in number of vessels constructed, however.

The volume of welding at Richmond is constantly increasing, now standing at about 50 miles a day, as this is written. Only a week ago, it was 47 miles. In June, from all the Kaiser Richmond yards, 25 merchant ships and one Naval vessel were delivered. For July there are 31 launchings scheduled—one a day, including Sundays and the Glorious Fourth. Power requirements, principally for welding, are now 50,000 kva. daily.

Very little criticism ever has been leveled against Richmond Yards Nos. 1 and 2. Richmond Yard No. 3, for which a brilliant career in postwar construction has been planned, is obviously papa's pet even though public opinion, sometimes jealous and sometimes disgruntled, has tried to make it a black sheep. Here is why Kaiser lavishes so much affection on it: Work on No. 3 was started Jan. 14, 1942. In terms of heavy engineering construction, Kaiser men figure that the actual amount of work in building the yard was half that required for the construction of Boulder (née Hoover) Dam. Boulder Dam was originally figured as an eight-year job, but the Six Companies, of which Kaiser was one, finished the job in five years. In one year and seven months, the No. 3 yard has been completed, five C-4 modified transport vessels have been launched, and eight special Naval vessels, each requiring about four times the number of manhours required for a Liberty ship, have been outfitted. A Non-Kaiser yard received contracts for similar C-4 vessels at exactly the same time, and it is reported that this other yard will not launch its first vessel until November. Yard 3 is scheduled to deliver its first C-4 in November.

THE balance of scrap supply in southern California has been tilted from plenty to scarcity by revision of requirements at the Kaiser Fontana plant. In the days when Fontana was in the planning stage, a 100 per cent pig iron open hearth charge was proposed. After recruiting of operating management, this was modified until it was estimated that only 8,000 tons of scrap a month would be required. In actual current operating practice, Kaiser is reported using a 65 per cent hot metal charge. On this basis, requirements loom as 600 to 700 tons of scrap a day, or about 20,000 tons a month, to supply the four open hearths now operating. Thus southern California has suddenly become a "minus area" for steel scrap.

In the past, the Pacific Southwest has shipped as much as 50,000 tons of steel scrap monthly to northern California. Current discussion indicates the possibility of shipping scrap from the San Francisco Bay area back to the southern part of the state.

Fontana still is declared offering pig iron on the open market but, practically speaking, quantities probably are limited because of greatly increased open hearth requirements. Finishing facilities at the plant are not yet in operation, and ingots are being turned over to Lend-Lease.

Cast scrap on the Coast is extremely tight, and foundries must scratch to meet requirements.

WHILE on the subject of Kaiser, mention must be made of a report that the three Kaiser shipyards in the Portland area now have a higher ratio of women production workers than any other of the 25 major shipyards in the country. At the end of June, 22 per cent of the production workers at the three yards were women. It is just a little more than a year since the first woman, a welder, was employed. Current employment records show 20,636 women in practically all departments. About 3,000 are welders, assistants or trainees, crane operators, and machine shop workers. The ranks of riggers number 145. So far none are employed as riveters, in the mold lofts, or on excavation projects.

California labor statistics show that women constituted 22.3 per cent of all wage earners in durable goods industries in May, compared with 5.2 per cent a year previous. There were 25.1

PRECISION

Thread Grinding

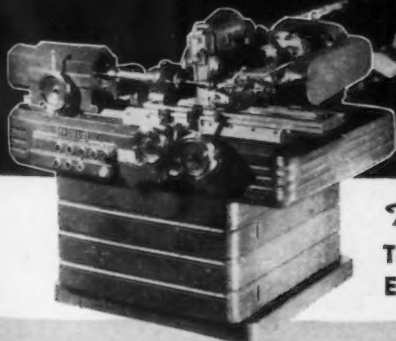
... the modern method of producing accurate threads

Precision thread grinding has already become a vital step in the accelerated production of accurate threaded parts by American industry. Many manufacturers of parts for war material are grinding threads with Ex-Cell-O Precision Thread Grinders after the threaded parts are hardened, or grinding threads from the solid after heat treatment, because only by this method can they obtain uniformly, a high standard of accuracy in thread form, size, and finish. ... With an Ex-Cell-O Precision Thread Grinder, you, too, can produce accurately ground threads on a profitable production basis. You can not only take advantage of today's great demand for precision threaded parts, but also provide for the future, when the precision grinding of all threaded parts in which accuracy is essential will undoubtedly be required.

EX-CELL-O CORPORATION • DETROIT



To the left: Ex-Cell-O Style 31 Precision Thread Grinder (this is one of nine styles of Ex-Cell-O precision thread grinding machines).



Precision THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT • PURE-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS



EX-CELL-O for PRECISION

per cent women in all California manufacturing industries in May, 1943.

There are some indications that employment of the so-called weaker sex may be leveling out, however. No increase was shown in California for May over April, in all manufacturing industries, a seasonal decrease in non-durable being offset by an increase in the durable goods industry. The total of 216,800 female factory workers in May, however, was three times that in the same month a year ago, and more than four times the number employed in May, 1941.

The month of May was the second in succession in which the number of women workers in the aircraft industry decreased, and undoubtedly, with the closing of schools for summer vacation, the trend will be sharply accentuated when June figures are released. In May, 101,600 women were employed in California aircraft plants, 300 below April and 600 below the peak of 102,200 reached in March.

About a third of the aircraft plants reporting to the State Division of Labor Statistics and Law Enforcement said they had employed fewer workers in May than April.

The trend is still upward in the employment of women shipyard production workers, with 20,900 employed in California yards in May. That means that the three Kaiser Portland yards were employing almost the same number of women as all California shipyards combined.

The Pacific Northwest, which owes much of its industrial growth—and all of its expansion in the light metal industries—to cheap power may find itself dangerously close to a power shortage by the fall of next year or by 1945, Bonneville Power Administration officials were quoted as stating last week.

This fear is based upon rejection of the Administration's desire to provide additional storage waters by construction of dams in Montana and

Idaho to assure capacity operation of Grand Coulee and Bonneville generators during the slack water period from November to April.

Counting on additional power demand, Bonneville officials indicate that the margin of capacity over demand by the fall of 1944 or shortly thereafter may be so slight as to threaten uninterrupted capacity production.

Appraisal of these fears must be balanced against the Administration's desire to build a third giant dam, Umatilla Dam, in the Columbia Basin as a war measure.

Completing its Renton, Washington, plant Boeing has commenced construction of a new airfield. The new field will have a two-way concrete take-off strip more than a mile long and 200 ft. wide. A narrower concrete taxiway is planned for the west side of the field. Present work consists of clearing the site which involves moving a shipyard, lumber mill, nursery and several houses.



... Cited for Awards ...

••• Excellence in war production has merited the following companies the Army-Navy "E" award:

Worthington Pump and Machinery Corp.,
Moore Steam Turbine Division, Wellsville,
N. Y.

Philadelphia Gear Works, Inc., Philadelphia.

Revere Copper and Brass, Inc., Baltimore Division, Baltimore.

Ark-Les Switch Corp., Watertown, Mass.

Bethlehem-Hingham Shipyard, Inc., Hingham, Mass.

Borg-Warner Corp., Muskegon Heights, Mich.

Bristol Co., Waterbury, Conn.

Brown Instrument Co., Philadelphia.

E. Burkhardt & Sons Steel and Iron Works Co., Denver.

Casey-Jones, Inc., plants at Luray, Elkton, Mount Jackson, Shenandoah and Woodstock, Va.

Chicago Bridge and Iron Co., U. S. Naval Drydocks, Newburgh, N. Y.

General Electric Co., York, Pa.

General Machinery Co., Spokane, Wash.

Gillette Safety Razor Co., Boston.

H. R. L. Machine Works, Inc., Seattle.

International Silver Co., Meriden, Conn.

Librascope, Inc., Burbank, Cal.

Phillip Myers Co., Towson, Md.

Nashville Bridge Co., Nashville, Tenn.

Pacific Gear and Tool Works, Inc., San Francisco.

Waukesha Foundry Co., Waukesha, Wis., and Watertown, Wis.

Atlas Powder Co., Reynolds Plant, Reynolds, Pa.

Baker Mfg. Co., Springfield, Ill.

Bastian-Blessing Co., Chicago Plant, Chicago.

Carborundum Co., Niagara Falls Plant, Niagara Falls, N. Y.

E. D. Clapp Mfg. Co., Auburn, N. Y.

Dow Chemical Co., Great Western Division, Pittsburg, Cal.

Fay and Scott, Dexter, Me.

Freeport Sulphur Co., Grande Ecaille Plant, Port Sulphur, La., and Hoskins Mound Plant, Freeport, Tex.

Hannifin Mfg. Co., Ordnance Division, Plant No. 2, Chicago.

Hercules Powder Co., Hercules Plant, Hercules, Cal.

Johns-Manville Products Corp., Lompoc Plant, Lompoc, Cal.

Multiplex Mfg. Co., Berwick, Pa.

Orange Screen Co., Maplewood, N. J.

Springfield Buick Co., Springfield, Mass.

Taylor Instrument Companies, Rochester, N. Y.

Worthington Mower Co., Stroudsburg, Pa.

L. A. Young Spring & Wire Corp., Trenton Plant, Trenton, N. J.

Zollner Machine Works, Fort Wayne, Ind.

Maritime Commission M

Air Reduction Co., Inc., Bethlehem, Pa., and subsidiaries.

Homestead Valve Mfg. Co., Inc., Coraopolis, Pa., gold star.

Air Preheater Corp., Wellsville, N. Y.

Westinghouse Electric & Mfg. Co., Merchant Marine Division, Lester Branch, Philadelphia.

LIFTING A YOUNG INDUSTRY OUT OF OLD HAZARDS

TESTED "IN ACTION" ON THE GROUND *for safer action in the air!*

Not so long ago the only dependable way to check the operation of many parts of an airplane was to test them in action. And if tests had to be made in actual flight at the risk of a pilot's neck—well, in those days, what were test pilots for, anyway?

But HydroILics has changed that.

For example, the gasoline-powered HydroILic Test Stand shown at right checks the whole hydraulic system of an airplane in a few short minutes—while the plane is safe on solid ground. It's a mighty important test because ailerons, rudders, brakes, bomb bay doors, landing gear, and even the propeller pitch of modern planes depend on the hydraulic system for safe, smooth, accurate operation.

Other HydroILic Test Stands check other phases of airplane performance on the ground, for safety in the air.

Aircraft Testing Equipment is merely one of many ways in which Denison HydroILic engineers have applied the numerous advantages of oil-hydraulic operation. The smooth, flexible, accuracy of HydroILic's oil-transmitted POWER, SPEED and CONTROL has been adapted to an impressive range of operations in almost every industry. Have you sounded out the new possibilities for improving your product, or its production, with Denison HydroILic engineering or equipment? For information, call your Denison representative, or write to Denison engineers.

The DENISON ENGINEERING CO.
1158 DUBLIN ROAD, COLUMBUS, OHIO



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DENISON
EQUIPMENT in APPLIED
HydroILics

INDUSTRY'S NEW RIGHT HAND
POWER SPEED & CONTROL

Fatigue Cracks . . .

BY A. H. DIX

Wrangling in the Rear

• • • War was expected to have a unifying effect on us home guards, if not at once, at least when the casualty lists began to pour in. We were supposed to file in the deferred-for-the-duration folder those of our differences that would slow up the war effort. But the rolls of the killed and crippled continue to mount and unity is still absent.

The reason may be inability to project our national mind to the scenes of a war being fought thousands of miles away. If this be so, then the cure is to bring the war home to us. One of the ways of doing this is demonstrated by an obituary appearing in the current issue of *Lukens Plate*, the Lukens Steel Company's employees' publication:

Technical Sergeant Fred Manship, Jr., the lad who began by carrying the mail here at Lukens, is dead in Africa.

Freddie was still "carrying the mail" for all of us when he met his death. He had traded his bicycle for a Flying Fortress. Instead of a bell, he was using a radio to send out his signals.

His "mail" was also a little different from the kind he used to distribute here. His Flying Fortress, "The Warrior," carried lethal packages of steel and explosives—bombs—earmarked for the Axis.

No one can read that, whether he runs the business or shovels slag out of a slag pit, without having his personal discomforts, grudges, and gripes undergo a sudden shrinkage.

Aptronyms

• • • Harold F. (University of Alabama) Cotter tells us that the Anniston, Ala., fire department has a Captain Rainmaker. But we are baffled by a postcard headed "Aptronyms" sent us by Miss Anna Louise Nestmann, of 1031 Cross Ave., Elizabeth 3, N. J. The card reads:

Do you know that E. W. Blank is an analytical chemist for Colgate-Palmolive-Peet Co.?

The aptronymical significance of this escapes us. We are happy to report that it is also over the well-thatched head of Frank Oliver, your favorite family journal's technical editor, who, as a Tau Beta Pi man, ought to know everything. If you can detect any affinity the name Blank has for analytical chemistry or soap-making we yearn for word from you.

Something New Will Be Added

• • • Miss Nestmann gives her address as Elizabeth 3, N. J., in accordance with the post office department's recent zoning of the 124 larger cities. The object of the zoning is to speed mail distribution, and if you are in one of these 124 metropolises your district number will be added to your address stencil.

Don't bother to send it in. We will get it direct from your local postmaster. With many thousands of stencils to change, obviously the job is too big to be handled all at one time. We plan to tackle the smaller of the 124 zoned cities first, as copies are already routed direct to branch post offices in the dozen or so larger cities. But whether you are in a seven-digit pop. city or a six-digit, we'll get around to you in time.

Billet Doux Via Gutenberg

• • • Among our treasures is a love letter from Christine Frederick, of our favorite magazine, the *Atlantic Monthly*. It begins:

"I am 'in a state,' because I have just seen the brand-new Atlantic which comes out in a few days' time. My first thought was of you."

We didn't know Christine cared, and the fact that

the letter is printed detracts only slightly from our appreciation of her message. We always have been a sucker for the personal approach.

Sugar is Sweet and . . .

• • • Which reminds us to mention that R. Raymond Kay, your Southern California task force is authority for the statement that Miss Lolly Poppis is employed in a So. Calif. aircraft plant.

Aircrafter Dives Into Yesterday

• • • Ray also passes along a poem that C. L. Hibert, assistant chief of manufacturing reasearch for Consolidated Vultee Aircraft, dug up in the September, 1858, issue of the *Atlantic Monthly*. He would like help in translating it into 20th century English. The title means "To spend the summer; to pass the time in torpidity." Take a deep breath:

Aestivation

In candent ire the solar splendor flames;
The foles, languescant, pend from arid rames;
His humid front the cive, anhelng, wipes,
And dreams of erring on ventiferous ripes.

How dulce to vive occult to mortal eyes,
Dorm on the herb with none to supervise.
Carp the suave berries from the crescent vine,
And bibe the flow from longicaudate kine!

To me, Alas! no verdurous visions come,
Save yon exiguous pool's conserva-scum—
No concave vast repeats the tender hue
That laves my milk-jug with celestial blue!

Me wretched! Let me curr to quercine shades!
Effund your albid hausts, lactiferous maids!
Oh, might I vole to some umbrageous clump—
Depart—be off—excede—evade—erump!

Many of the words are no longer in even the brains department's unabridged. The lexicographers have retired *foles*, *cive*, *ventiferous*, *ripes*, *albid*, *hausts*, *vole*, *bibe*, *excede*, and *curr*. So we can only guess what they mean, but an expert word man like John C. (Bethlehem Steel) Long, for example, could probably reel the definitions right off.

We'll take a chance on *vole*. According to the unabridged it means a rodent, but our guess is that in the '50's it meant to *fly*, like Consolidated-Vultee's Liberator.

Prescient Hittite

See your last week's item headed "B. C. Expediting."
How could any document be dated 1200 B. C.?

—Margo Barham,
Ex-Cell-O Corp., Detroit

A similar letter, only more sarcastic, was received from Doug (E. F. Houghton & Co.) Miner. The sentence that is criticized read, "The letter, written in Assyrian cuneiform and dated 1200 B.C. . . ." As it is our policy to admit error only when there is no way of squirming out of it, we report that our drugstore dictionary authorizes us to employ the verb *date* to indicate "the time of an epoch or transaction."

And if Miss Barham and Mr. Miner argue that our dictionary is over-tolerant then we will then disclose what we had hoped to keep secret: That the writer of the letter, a Hittite ironmaker, was a great one for looking ahead. He was in fact known as the Nostradamus of the 1200 B.C.'s.

Puzzles

Last week's almsgiver had \$2.20. The beggars numbered 28.

Twenty minutes for this is par:

A farmer leaves 45 casks of wine, of which 9 each are full, three-quarters full, half full, one-quarter full, and empty. His five nephews want to divide the wine and the casks, without changing wine from cask to cask, in such a way that each receives the same amount of wine and the same number of casks, and further so that each receives at least one of each kind of cask, and no two of them receive the same number of every kind of cask.



This six year old Cyclone averages over 1500 tons of tempered parts per year at a maintenance cost of only 1c per ton!

6 year old **CYCLONE** averages 29½ tons of tempered steel per week!

IN JULY 1937, the gas fired Cyclone, shown above, started to turn out uniformly and accurately tempered parts at the rate of 9850 lbs. per day. The work was of various kinds and heated at different temperatures. Today, after almost six years of continuous service and the production of over 9,000 tons of work, this 22" diameter by 26" deep Cyclone is as efficient as the day it was installed.

1¢ PER TON!

Even with heavy production schedules, all of the replacement material, over the span of years, has been only \$93.77, or 1 cent per ton average.

The Lindberg Cyclone Tempering Furnace, like all Lindberg equipment, is built to "take it." Before it is ever announced to the trade, each furnace has to pass the grueling gauntlet of several commercial

production lines. It is worked on by heat treater and engineer alike until it can be honestly okayed as the "practical furnace for the practical heat treater."

BULLETIN 52 AVAILABLE

Bulletin 52, on the Gas Fired Cyclone Furnace, shows the wide range of sizes available, a cross section view showing the famous Lindberg recirculating principle, construction features and pictures of Cyclones at work on a wide variety of work. Bulletin 52 will gladly be sent on request. WRITE TODAY!

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SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRIZING for scale-free and decarb-free hardening

Dear Editor:

DIE SETTING

Sir:

Can you tell me where to get a book on die setting, on both principles and method?

J. H. SCHAEFER

1175 Richie Ave.,
Lima, Ohio

● We know of nothing in print on die setting, that is, die tryout. No book on die design and the plastic working of metals that we are familiar with has even a chapter on the subject.—Ed.

CYCLE WELDING

Sir:

On last week's "Dear Editor" page, H. H. Godfrey of Dobbins Mfg. Co., Elkhart, Ind., asked for information on the "Clyde-Weld Process of joining metals."

Could Mr. Godfrey have in mind cycle welding as developed by the Goodyear Tire & Rubber Co., Akron, Ohio, for the joining of aluminum and magnesium?

WILLIAM A. PHAIR,
Chicago Editor

The Iron Age,
1012 Otis Bldg.,
Chicago 3, Ill.

500-TON CASTING

Sir:

In your June 24 issue, Albert Mitchell asked, "What is the weight of the heaviest casting ever made in the world and where was it poured?"

Scientific American for April 18, 1874, page 247, contains a complete description of an anvil weighing 500 tons, with a cubic volume of 2700 cu. ft. This anvil was made in a gun factory at Perm, in the northeastern part of Russia. Fourteen cupolas were erected for the job. Over two months were required to cool the casting, which was completed in October, 1873.

HARRY EVERETT,
Shop Supt.

Power Brake Equipment Co.,
1416 S.E. Eighth Ave.,
Portland, Oregon

COMPARABLE ELECTRODES

Sir:

This Station desires to obtain six copies of the tables for Comparable Arc Welding Electrodes, as published in THE IRON AGE, May 13, 1943.

Please advise us if there is any charge for these tables.

A. C. COOGAN,
Prin. Asst. for Production
U. S. Naval Torpedo Station,
Newport, R. I.

● Mailed today. No charge.—Ed.

NE STEEL WALL CHART

Sir:

The NE Steel Wall Chart has commanded considerable attention in our Engineering Department. We would

like to secure 12 more copies. What is the cost?

J. E. LAMPMAN,
Engineering Coordinator
Consolidated Vultee Aircraft Corp.,
Nashville 1, Tenn.

●25c each.—Ed.

FORD, NOT WILLYS-OVERLAND

Sir:

I just ran across the picture on page 104 of your March 25 issue entitled, "Swimming Jeeps." Both picture and caption are absolutely erroneous. The picture shows two Ford-built Amphibians climbing out of the Ford Rouge slip up a ramp at Dearborn. In the background is the Ford Motor Co.'s glass plant. Your caption reads, "Amphibian Jeep Trailers manufactured by Willys-Overland Motors come out of the water. . ." The picture was taken in the Rouge plant, and the Amphibians are Ford-built.

Moreover you are wrong on the weight of the vehicles, their overall length and width, their floor area and roadside height. Inasmuch as the censors have not released these figures, I cannot give them to you, but I can promise you that you will be in for a surprise if and when these figures are released.

JOHN T. SMITH

735 N. York,
Dearborn, Mich.

● We apologize to Ford in our own name and also in that of the Wide World News Service, from which we obtained both photograph and caption.—Ed.

CASTINGS CLEANING RULING

Sir:

Your News Front of June 17 reads, "A new British ruling reduces the cleaning of castings to a minimum and prohibits improvement of surface appearance by welding or filling." If this ruling is available, will you please send us a copy.

CHARLES A. BENZ

Chicago Malleable Castings Co.,
Railway Exchange Bldg.,
Chicago, Ill.

● We have no copies here, but they can be obtained from the British Cast Iron Research Assn., Alvechurch, Birmingham, England. Ask for Clause 4 of British Standard Recommendation for the Wartime Finish of Machinery and Plant, No. 1, 114-1943.—Ed.

SOUTH DAKOTA TIN MINE

Sir:

In a recent News Front, you mention a tin mining scheme in South Dakota. Will you please let me know the name of the company.

HYMAN EHRLICH

15th & Market Sts.,
Philadelphia 2, Pa.

● Barium Stainless Steel Co., Metal Division, Canton, Ohio.—Ed.

HILCO CUTTER GRINDER

Sir:

Please give me the name of the manufacturer of the Hilco Universal Cutter Grinder.

W. C. WADEMAN

Blairstown, N. J.

● Berco Mfg. Co., 427 West Superior St., Chicago.—Ed.

BLACK FINISH

Sir:

The article, "Phosphate and Oxide Treatments for Steel" in the June 3 issue interests us. We contemplate one of these black type finishes now, and would appreciate additional information.

C. E. FELDKIRCHER,
Vice-President

Nashville Wire Products Mfg. Co.,
2315 Stewart St.,
Nashville, Tenn.

● Clippings of Iron Age articles on the subject are being sent you. For further information, we suggest that you write to these makers of materials for providing a black type finish: E. F. Houghton & Co., Philadelphia; Heatbath Corp., Springfield, Mass.; Alrose Chemical Co., Cranston, R. I.; and Mitchell-Bradford Chemical Co., Stratford, Conn.—Ed.

SPONGE IRON

Sir:

Where can we get technical information regarding sponge iron; also where can we find the Gap-mill rolling process described?

F. K. VAN ALMELO
Consolidated Car Heating Co., Inc.,
Albany, N. Y.

● See the July 23, 1942 and Jan. 7, 1943 issues of The Iron Age. The Gap-mill rolling process is new to us.—Ed.

STEEL FOR SEPTIC TANKS

Sir:

Our main production in the past has been septic and basement oil tanks made of 14 gage hot rolled steel. We have not been able to get any war work and are shut down due to lack of steel. However, every day we are called on to see if we can supply basement and septic tanks for replacement purposes.

Is it possible to obtain a carload of steel, so that we might at least supply tanks for replacement purposes?

F. E. TOWNLEY,
Manager

The O-Gas-Co Sales Co.,
Anthony Street,
Schenectady, N. Y.

● Where septic tanks or oil tanks are ordered for replacement, you can obtain steel by applying to WPB for an allotment for a quarter of the year. Your regional WPB office will supply you with Form CMP-4-B on which you can show the amount of steel you require. The form, when completed, should be submitted to the Plumbing and Heating Branch of the WPB, Washington. When the allotment is approved you will be able to place your order with a mill or warehouse for filling. Or you might submit your case to the Engineering Board of Review, WPB, Washington, asking that your product be reclassified as Class B, which would permit you to apply each quarter for an allotment of steel to make a controlled number of units.—Ed.

Clock-watchers Wanted



ESSENTIAL BUSINESS
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ENGINEERING

GORDON PRESSMAN
 Experienced on first quality work: steady
 and reliable. Phone 2-1000.
 1000 N. Main St., Chicago, Ill.

CLARK TACKER—Experienced, steady and
 efficient. Available during vacation.
 Apt. 2, 1211 N. Main St., Chicago, Ill.

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LATHE HANDS
 FOR
TURRET LATHES
ENGINE LATHES

Experienced or Trainees
 100% WAR WORK
 FLAG PLANT
 Northwest Ind.

**Illinois Gear &
 Machine Co.**
 1100 N. Main St.

Wheelabrator Airless Blasting

What Users Say:

- ★ "The machine has not only enabled us to give a finer appearance to our product, but has shown a considerable saving in grinding and grinding wheel costs."
 —Perry-Fay Co.
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THE IRON AGE, July 15, 1943—97

This Industrial Week . . .

- **Miners Still Jeopardizing Steel Production**
- **Agencies Ask 22,700,000 Tons in Final Quarter**
- **Stated Needs for Shipbuilding Are Higher**
- **Technical Groups Will Act on Alloy Turnings**

PRODUCTION of steel for the war was still being jeopardized this week in the Pittsburgh district due to uncertain conditions in the coal fields, where roving bands of pickets have been disrupting operations. It was estimated that 11,000 miners were idle Tuesday, while 14 blast furnaces were down for lack of fuel. Operations at the Clairton by-product coke plant were reduced to about 50 per cent and there was a possibility of a further decline unless coal was received quickly.

It is now estimated that the series of coal strikes which started last Spring and now are viewed as the worst domestic disaster since the war started, caused the loss of 220,000 tons of steel instead of the 170,000 tons which THE IRON AGE estimated several weeks ago prior to the continuation of the outlaw strikes. Important by-products needed for war have been lost also. The steel-for-victory drive has been hampered definitely. Strategic stockpiles of coal and coke probably cannot be rebuilt to a comfortable level for the duration of the war. No immediate step which will end the troubles at the mines appears to be in sight.

National steel ingot operations are 95.5 this week, down one point from the level of a week ago. The Pittsburgh district shows a drop of six points to 92.

DEMAND for fourth quarter steel by Claimant Agencies is reported to be approximately 22,700,000 tons against a supply of about 17,000,000 tons. Third quarter demand was about 800,000 tons greater than the reported fourth quarter requirements. Third quarter allocations of carbon and alloy steel were 17,500,000 tons.

Meanwhile the "Share-the-Steel" drive has raised to about 200,000 tons the quantity voluntarily given up from excess inventories. Most of this is for third quarter use, though a small quantity covers fourth quarter inventories.

Contrary to guesses published Monday concerning reduced Navy demands for steel for the fourth quarter, it is reliably reported that they are considerably above the Navy's third quarter requirements for both

carbon and alloy tonnage. Maritime Commission requirements for the fourth quarter are also up. This was expected in view of the sharp cut in the Maritime Commission's third quarter allotment.

Interesting developments have occurred on the steel mill labor front. The industry's 48-hr. week petition to the War Manpower Commission taking exception to the necessity for consulting with the union and suggesting certain practical changes in operating procedure, was turned down. Several companies have been given exemptions to hire unskilled labor, however. Very little surplus steel mill labor will result from the 48-hr. week, judging from the small number of release lists which have been filed with WMC.

Regardless of the newly enacted anti-strike law, the War Labor Board is ordering maintenance of membership clauses in union contracts. The question has now been raised whether sponsors of the law will at the next session of Congress seek to enact an even stiffer measure. The WLB this week, in an action which was said to be agreeable to both employers and the union, gave approval to the membership maintenance clause in contracts between the CIO and two subsidiaries of United States Steel Corp.

IN Washington, American-British cooperation in metallurgical fields will bear fruit this week when technical groups meet to carry out a recommendation with respect to alloy turning segregation made by a joint committee appointed by former steel director H. G. Batcheller. Studies carried on both in this country and Britain revealed that while English alloy recovery methods are superior to those of the United States, the British have been using richer alloys than necessary to provide comparable physicals of American alloys. The standardizing of grades of steel and metallurgical nomenclature has been decided upon with broader exchange of technical information for the future.

After gradually overcoming critical shortages of alloy steel, officers of the Aircraft Procurement Branch in Dayton, Ohio, now are reported encountering more difficulty on obtaining certain carbon steels than in getting alloy grades. This may retard the drive to change specifications to carbon steel.

The ore vessel "Carl D. Bradley" passing through the New MacArthur Locks at Sault Ste. Marie, Mich., officially opened the new \$14,000,000 structure that was built in the record time of 15 months. Now some of the large new lake vessels will be able to carry full loads of ore, which will help meet the 91,000,000-ton ore quota set for this season.

Among the headaches in the steel industry last week and this week continued to be the number of CMP

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carryovers. The amount of orders which steel mills have been allowed to accept is usually 110 per cent of the previous month's directives. The WPB steel quota directives call for 95 per cent completion, which means that the usual number of orders accepted are about 105 per cent of capacity. The carryovers have been building up to such a point where they have affected the delivery of some material.

IN order to expedite steel deliveries to small oil producers and to provide for emergencies, pipe mills this week are expected to have built up their share of a total mill stock of 20,000 tons of oil country goods sizes. This is a first part of a plan evolved a few months ago to assure prompt deliveries to small oil producers. The material will be for the use of operators who drilled less than 40,000 ft. in 1940. Various pipe mills have participated in the 20,000 tons of mill stock to the extent of their per cent of pipe capacity or its equivalent. The material is under the direct control of the WPB which made available production directives for the mill stocks. Any shipment made from these stocks is to be replaced from the next rolling. Orders filled from the mill stock must go through the CMP routine and the allotment numbers must be followed by the letters "MS" meaning mill stock.

In Canada as in some western areas of the United States, a labor shortage is creating a serious situation in the base metal mining industry and has curtailed production by many of the Dominion's largest producers. Mines, smelters and refiners are short about 1200 men and have closed some of their facilities. Canadian steel and iron production continues at a rate

Tung Oil Supply Situation More Critical

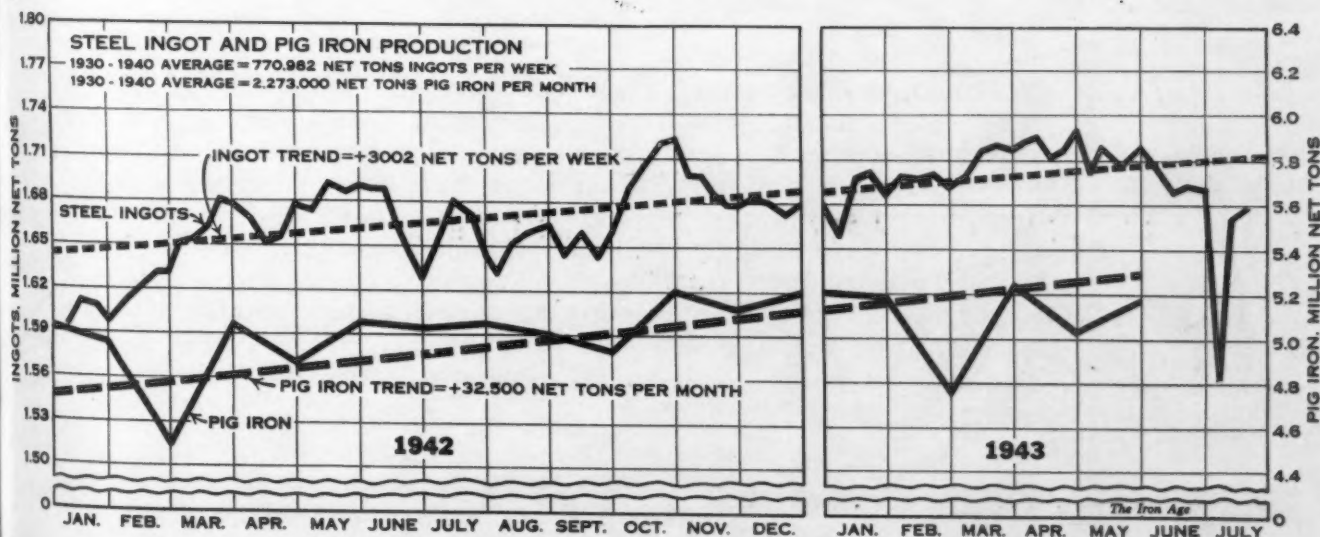
Chicago

• • • The tung oil supply situation is tighter. Magnesium foundries which use tung oil for impregnating castings have had difficulty obtaining enough, and at least one melter has been forced to quit using it altogether. The War Food Administration and WPB have reduced the quantity of tung oil to be made available for the next 12 months in the making of metal food containers.

below the peak records made in the first half of 1942, although it is stated in government circles that output for the last half of this year will be stepped up well above the current level. For the first five months of this year production of steel was off 3.6 per cent from the same period last year, while pig iron output dropped 12 per cent.

IN addition to the Pittsburgh drop of six points to 92, other factors entering into this week's ingot production decline of one point from last week, were a drop of seven points to 100.5 at Detroit, at Wheeling a drop of three points to 85 and at Buffalo a drop of two to 104.5. Chicago rose two points to 99.5, Youngstown one point to 94.5, Cleveland two points to 98, St. Louis 21 points to 120, and the Eastern district 22.5 points to 108. Philadelphia, Southern Ohio River, Southern and Western districts remained unchanged.

The Iron Age



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S. Ohio River	St. Louis	East	Aggregate
July 8	98.0	97.5	93.5	93.5	96.0	106.5	88.0	102.0	107.5	102.0	107.0	99.0	85.5	96.5
July 15	92.0	99.5	94.5	93.5	98.0	104.5	85.0	102.0	100.5	102.0	107.0	120.0	108.0	95.5

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PITTSBURGH PENNSYLVANIA

Coal Strike Offsetting WPB Steel Drive; Further Threats Loom

Pittsburgh

• • • A serious situation was in the making here this week. On Tuesday more than 11,000 coal miners were still out on strike. The Carnegie-Illinois Steel Corp. Clairton by-product plant on Tuesday was down to 50 per cent of operations and there was a

okes uses war powers to divert coal to steel mills. See page 107.

possibility that further reductions would be made if the company could not get more coal.

A further drop in the by-product coke plant output would shut down more of the blast furnaces of the U. S. Steel Corp. in the Pittsburgh-Youngstown district. Tuesday there were 14 furnaces down for lack of fuel. A lower operation at Clairton would reduce steel output of the corporation plants almost to a relative vanishing point.

Other plants in the district were being affected this week. Jones & Laughlin Steel Corp. mines had returned to production but only after operations were affected. The Pittsburgh district rate this week is estimated at 92 per cent but later revisions may make this rate lower if the present coal muddle continues.

With scrap being used in much larger quantities and with pig iron for steel making lost, another week like the past two would just about scuttle the entire WPB drive for more steel. It would also reduce the huge workings of the U. S. Steel Corp. plants in this district to such a low point that it could almost be termed a "shutdown."

The damage done to plants, the steel losses, the using up of strategic supplies of coal and coke, the setback given to the WPB drive and the makings of a serious coal and coke outlook for this Fall stand out and label the coal strikes the worst possible disaster that has occurred since the war started.

Open revolt in defiance of the United States Government and United Mine Workers officials as well, has raged in Western Pennsylvania for the past three weeks. Despite orders



to return to work and the passing of the War Labor Disputes Act, roving pickets last week had closed more than 25 mines in this district. Most of these furnished coal to steel companies.

Grand jury action expected July 14 to investigate the coal strike had early this week made only a slight impression on the insurgents. A noticeable drop in the number of pickets was discernible on Monday and Tuesday. However, at the beginning of the week there were still about 20 mines idle and despite the absence of pickets most of the miners refused to go back to work.

Over the weekend United States Steel Corp. was forced to bank nine

additional blast furnaces in the Pittsburgh-Youngstown district, making a total of 14 out of production early this week due to the coal strike.

Loss of steel which had been set previously by THE IRON AGE at more than 170,000 tons for the three strikes is now revised upward because of the continuation of the outlaw strikes. Estimates indicate that total steel loss is now in excess of 220,000 tons since the disputes began. Some of this irretrievable loss was brought about by intangibles such as slow downs, increased use of scrap and mechanical difficulties caused by putting units on and off on sudden notice.

This week it had begun to appear that the WPB's drive for more steel had received such a setback as a result of the coal strikes that its goal of a million tons for the third quarter might be seriously endangered. Part of this increase had been expected to come from increased steel production, both from existing units as well as new ones to be brought in. Lack of coal and coke will make this part of the job a difficult one.

Buffalo

• • • Soft coal moved into Buffalo more liberally by lake and rail this week and danger of curtailment of steel operations faded. Donner-Hanna Coke Corp., supplying Republic and Hanna Furnace with coke, reported it planned to maintain coke-making operations at present capacity levels.

Auto Workers Favor Federal Ownership

Detroit

• • • Government ownership of monopolistic industries and a 30-hr. week are highlights of the post-war program of the C.I.O. United Automobile Workers Union.

In the field of government, the program recommends not only government ownership of "monopolistic" industries, but also of industries strategically essential to national safety.

In the field of private enterprise, rehabilitation and protection of small business is recommended along with reduction of the working week to 30 hr. without reduction of pay.

48-Hr. Week Will Absorb Most of Workers in Steel; Petition Is Denied

Pittsburgh

• • • The 48-hr. week in the steel industry, which is expected to be fully complied with by Aug. 1, will not solve the steel manpower shortage, according to opinions gathered here and elsewhere in the steel industry. So-called "release lists" which were to have been furnished to WMC by July 1 and which were to have represented surplus labor as a result of going to the 48-hr. week were few and far between and for the most part, came from smaller companies.

The heavy drain on steel mill personnel by induction into the armed forces and normal turnover are two factors which will cause the complete absorption of any surplus labor which might materialize "on paper" as a result of the 48-hr. week. Furthermore new facilities will help absorb "extra" personnel. Although labor is supposed to be frozen, there is nothing to prevent a man from being "AWOL" for 30 days and then taking a new job. Then, too, when it can be proven that a man is worth more to war production on another job than the one he has, neither his employer nor the WMC care to withhold a certificate of availability.

This week the steel industry was rapidly going toward a complete 48-hr. week in all departments and

vocations except those where exemptions were granted or where appeals were to be taken. It is reliably estimated that close to 70 per cent of

For other reports on 48-hr. week in Steel Industry see THE IRON AGE March 25, pp 91-92; May 6, p 97; May 13, p 102.

steel companies' employees affected by the WMC ruling were already on a 48-hr. week.

The industry's petition to the WMC taking exception to the necessity for "consultation with the union," certain hiring restrictions and the lack of exemption for non-continuous steel departments, was turned down a few weeks ago by the WMC head, Paul McNutt. His turn-down, however, was accompanied by assurances that wherever "harm" might result from the WMC rulings speedy action would be forthcoming. Some steel companies were "up against it" because, under the regulations, they could not hire new employees until all workmen affected by the WMC ruling were on a 48-hr. week. It is understood that exemptions to this particular part of WMC General Order No. 8 already have been granted in Bethlehem, Youngstown, Pittsburgh, and Cleveland. Practically all of these exemptions which run to Aug. 1 involve the hiring of unskilled labor.

The difficulty in arranging some

personnel schedules so as to comply with the 48-hr. week ruling fore-shadows an exhaustive test of McNutt's "assurance" that relief would be granted speedily where hardships or effects on steel production were encountered. In cases where exemptions have not been granted, some steel companies have instigated appeals under WMC Order No. 5. There will be vigorous action where actual harm to steel production results from following WMC Order No. 8. An interpretation of the WMC appeal procedure seems to indicate that the action on which the appeal is being made may be interpreted as compliance pending the disposition of the appeal unless the chairman of the appeal board rules otherwise. This apparently means that any company which finds its production schedules being seriously interfered with and has not been granted exceptions will probably appeal the case, which would have the same force as an exception until the appeal board disposes of the problem.

Since the steel industry's petition to McNutt on various features of the 48-hr. ruling has been turned down, there is little more to do now except for individual companies to attempt to obtain necessary exemptions or make appeals to the regional director, or in some cases, the area director. The main contentions of the steel industry have been: That it already was going to a longer week wherever necessary, that the 48-hr. week itself would not increase steel production, that delays in obtaining exemptions which can only be granted after consultation with collective bargaining units would harass and delay production, and finally that the manpower shortage would still affect the steel industry regardless of a 48-hr. week.

There is still the question of the steel worker who is scheduled 48-hr. a week but due to absenteeism, only works 40. This would indicate that it is impossible for the steel industry to average 48-hr. a week for every employee. Future events will determine just how far McNutt will go in softening the impact of a mandatory 48-hr. week on such a highly intricate industry such as steel.

U. S. Buys Republic Plant

• • • A Government check for \$1,642,225 was on deposit for the Republic Steel Corp. in payment for its Monroe, Mich., plant.

SHIPBUILDING FAMILY: The Braukmillers of Portland, Ore., claim the title of "shipyardingest family" in the United States. Fifteen members, including in-laws work at the Kaiser Swan Island Shipyard, building tankers on the grave-yard shift. Besides the shipyard group, there is a son in the army, and a son in an East Coast war plant.

Wide World Photo



WLB Defies Anti-Strike Law; Orders Maintenance Clause in Union Contracts

Washington

••• The War Labor Board has done the expected. It has determined to continue its policy of meeting demands of organized labor leaders by ordering maintenance of membership clauses in union contracts, regardless of the newly enacted Connally-Smith anti-strike law. Representative Smith of Virginia, co-author of the law, had insisted that the law forbade such a clause unless it were voluntarily agreed to by employers. His opinion was shared by congressional supporters.

WLB public members had told THE IRON AGE that they would continue the policy of granting the maintenance of membership clause to unions, claiming that it was not prohibited by the new anti-strike law. They made good last week when they ordered insertion of the clause in three cases, the McQuay Norris Co., St. Louis, and the CIO-AUW; United Cork Co., South Kearny, N. J., and the CIO Rubber Workers and Herman Oak & Leather Co., St. Louis and two AFL unions. WLB Chairman

W. H. Davis said that the board would continue this policy.

Before passing on the cases WLB got the green light, which it knew would be flashed, from L. K. Garrison, its general counsel, who said that the anti-strike law did not bar the contentious clause.

As pointed out by THE IRON AGE last week, Representative Smith contends that the anti-strike law provides that WLB decisions must conform to the National Labor Relations Act "which prohibits the closed shop except by mutual agreement."

WLB maintains that decisions had been issued previously on the basis of an opinion by NLRB General Counsel Richard J. Watts that nothing in the NLRA barred maintenance orders. Employer members of WLB never accepted this opinion. They have consistently dissented from the opinion of majority members of WLB, made up of public and organized labor representatives, in ordering the maintenance of membership clause.

When Chairman Davis announced that the policy would be continued Representative Smith said that the

WLB Chairman was "deliberately and knowingly violating the law."

The question has now been raised whether sponsors of the anti-strike law, feeling that it has been flouted by WLB will at the next session of Congress seek to enact a stiffer law specifically barring WLB from ordering maintenance of membership and the closed shop in union contracts.

Meanwhile the first voluntary agreement to extension of the maintenance-of-membership clause since the passage of the Connally-Smith law was announced on Monday by the WLB and involves two United States Steel Corp. subsidiaries and the CIO-United Steel Workers. Since it was agreeable to both employers and the union WLB gave unanimous approval to the clause in contracts between the USW and the Tennessee Coal, Iron & Railroad Co., covering five departments of the company's plant at Birmingham, Ala., and between the union at the Oil Well Supply, covering the latter's plant at Oswego, N. Y.

The agreement also provides for the check off whereby union dues will be deducted by the companies from employees' pay. The maintenance of membership clause provides that after a stipulated date, all members of the union must remain in good standing during the period of the contract.

NO STRIKES?

Despite no-strike pledges and anti-strike legislation, work stoppages continue unabated in war industries

• Last week at least 20,000 coal miners in the Pittsburgh and Birmingham districts were away from work on "wildcat" strikes. Pittsburgh suffered most heavily through inoperative captive mines.

• About 6000 copper miners were idle for several days as a result of a strike of 100 railway conductors on the line servicing the mines of the Utah Copper Co., Bingham Canyon, Utah. Retirement benefits was the subject of the dispute.

• Gun production slumped at the steering gear division of General Motors Corp, Saginaw, Mich., for one day last week when tool grinders walked out over a swing shift proposal. Entire plant suffered for lack of tools.

• A near race riot caused by a fight between a Negro worker and a white foreman closed the American Steel Foundries' cast armor plant in East Chicago, Ind., for several shifts last week. The plant employing about 53 per cent Negroes was picketed by the Negroes who walked out en masse following the altercation.

• About 200 USWA-CIO members walked out at the General Steel Casting Corp., Granite City, Ill., plant,

following the dismissal of four men who refused to work on Sunday even at double time.

• Some 500 employees (USWA-CIO) of the Sacks-Barlow Foundries, Inc., Newark, N. J., lost a week's work in a strike starting June 5 protesting a WLB refusal to grant a 10c. an hour increase in pay. They returned last Friday.

• Aluminum production at the Aluminum Co. of America's Bridgeport, Conn., plant, was disrupted by a strike of 60 molders who walked out following an explosion of a mold which injured two workmen. Demands included better safety devices and a wage increase with bonus to compensate for hazardous working conditions. Several hundred workers were thrown into idleness for five days.

• Philadelphia suffered one day of peril as 121 employees of the bureau of mechanical equipment tied up the repair shops for police and fire equipment in a flash strike. Dispute was pay inequalities and proposed disqualification of workers over 55 years of age.

• Food for war has suffered an 11-day strike of about 250 workers of Best Foods, Inc., Bayonne, N. J., despite WLB demands for return to work.

Army Revises Procedure to Dispose Of Unnecessary Industrial Property

Washington

• • • Increasing with every tactical change in the war that has necessitated shifts in production and reflecting a recession in war construction, the War Department last week announced complete overhauling of the Army's procedures for disposing of government-owned and Army controlled industrial property. The purpose of the new procedure, it was stated, is to allow the wide scale of supplies, equipment, steel, copper, aluminum and other materials, to find their way back into the war production program with the utmost speed or into civilian channels if the war program does not require it.

The new procedure eliminates many present requirements that entail delays and permit sales of surpluses to private jobbers, wholesalers and dealers, when there is no known war use for them, and was effected through publication of revised Procurement Regulation No. 7. Measures were also taken to expedite the return of all materials having value only as scrap into the channels supplying such materials to war industries.

While the primary purpose of the new regulations is to insure prompt return of unneeded industrial property to productive use, they will also facilitate prompt liquidation of terminated contracts and financial rehabilitation of the prime contractor and innumerable sub-contractors and suppliers so that they may resume munitions production with a minimum of delay. They also expedite the physical removal of property on assembly lines, which is another essential prerequisite to resumption of production.

The new procedure authorizes Army disposal of industrial property for direct war use at any time by sale or lease to war contractors; by transfer to other War Department components or to the Navy; and by transfer to the American Red Cross and the United Service Organizations.

For the purpose of expediting and to insure disposal to the best possible advantage, all surplus property under the new procedure will be listed in five categories:

(1) Critical equipment items such as steel valves, pressure vessels, heat exchangers, pumps, compressors, machine tools, etc.; (2) Construction equipment; (3) Equipment and other industrial property not included in the other categories, which should be redistributed on a na-

tional basis; (4) Controlled materials including copper, steel, copper base alloy and aluminum; and (5) Property which can be practically redistributed on a regional, rather than a national basis.

Circularization lists of all these properties will be published and for a period of 20 days property can be disposed of only for direct war use by government agencies or war contractors. Upon the expiration of the 20-day period, remaining items of construction equipment will be reported to the Treasury Department Procurement Division. Such items as are not disposed of by Procurement

Division within a reasonable time may be sold by the War Department to any purchaser.

Other items remaining at the end of the 20-day period will be reported to WPB and will be available to War Department components, other government agencies, and may be sold to any private purchaser. Thus, after a brief circularization period of 20 days, property which cannot practically be returned directly for use in the war effort may be sold to dealers and jobbers, or returned to manufacturers. Items of property for which a use cannot be found under these procedures within a reasonable time—say three or four months—will be scrapped.

New MacArthur Lock Formally Opened

Sault Ste. Marie, Mich.

• • • United States Army engineers enlarged the Allies "jugular vein" on July 11 by starting operation of the MacArthur lock of the Sault Ste. Marie Canal.

The big concrete project, fourth lock of the canal, was named for General Douglas MacArthur and is designed to speed movement of war-essential iron ore down the Great Lakes.

It was built at a cost of approximately \$14,000,000 in the record time of 13 months, under the direction of Col. Paschel N. Strong, Detroit dis-

trict engineer, who supervised construction of the tunnels of Corregidor.

The lock is 800 ft. long by 80 ft. wide and 30 ft. deep. At present, 25 ft. is the greatest depth needed for any ship operating on the Great Lakes.

The new lock was gouged out of the site of the old Weitzel lock, constructed in 1881 as the first federally-built lock at the Soo. The canal itself came into being in 1855 with a tiny, tandem-operated lock. Three modern locks have been built in addition to this newest one in the last half century.

UNIVERSAL CARRIER: These tough little armored cars, faster than a tank, can plow through water almost as well as an amphibian reconnaissance car. They are manufactured by Ford Motor Co. at its Canadian plant for the British Army, and recently went into production at the Somerville, Mass., plant of Ford under Lend-Lease contract.



Six-Months' Steel Output Sets Record

• • • United States steel production in the first half of 1943 reached the record-breaking total of 43,866,912 net tons despite a sharp decline in

the June output because of the coal strike, the American Iron and Steel Institute announced.

The tonnage of steel produced in

YEAR 1943

Production of Open Hearth, Bessemer and Electric Steel Ingots, and Steel for Castings. Source: American Iron & Steel Institute

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

PERIOD	ESTIMATED PRODUCTION—ALL COMPANIES								Calculated* weekly production all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity		
January.....	6,576,589	97.8	478,058	85.9	369,395	95.4	7,424,042	96.8	1,675,856	4.43
February.....	6,033,674	99.3	447,843	89.1	344,532	98.6	6,826,049	98.5	1,706,512	4.00
March.....	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
1st Quarter...	19,395,558	99.3	1,429,574	88.4	1,095,146	97.5	21,920,278	98.4	1,704,532	12.86
April.....	6,509,812	99.9	481,810	89.4	382,532	102.1	7,374,154	99.3	1,718,917	4.29
May.....	6,664,298	99.1	483,024	86.8	398,057	102.9	7,545,379	98.4	1,703,246	4.43
June.....	6,188,857	95.0	453,599	84.1	384,645	102.6	7,027,101	94.6	1,638,019	4.29
2nd Quarter...	19,362,967	98.0	1,418,433	86.7	1,165,234	102.5	21,946,634	97.4	1,686,905	13.01
1st 6 months...	38,758,525	98.7	2,848,007	87.6	2,260,380	100.0	43,866,912	97.9	1,695,667	25.87
July.....										4.42
August.....										4.43
September.....										4.28
3rd Quarter...										13.13
9 months....										39.00
October.....										4.43
November.....										4.29
December.....										4.42
4th Quarter...										13.14
2nd 6 months...										26.27
Total.....										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons.

* Revised January through February, 1943.

YEAR 1942

Production of Open Hearth, Bessemer and Electric Steel Ingots, and Steel for Castings. Source: American Iron & Steel Institute

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

PERIOD	ESTIMATED PRODUCTION—ALL COMPANIES						Calculated* weekly production all companies (Net tons)	Number of weeks in month		
	OPEN HEARTH		BESSEMER		ELECTRIC				TOTAL	
	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity			Net tons*	Percent* of capacity
January.....	6,322,215	95.3	490,874	86.0	299,017	94.2	7,112,106	94.5	1,605,442	4.43
February.....	5,785,918	96.6	453,549	88.0	273,068	95.2	6,512,535	95.9	1,628,134	4.00
March.....	6,572,930	99.0	493,191	86.4	325,990	102.7	7,392,111	98.2	1,668,648	4.43
1st Quarter.....	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96.2	1,634,273	12.86
April.....	6,345,133	98.7	454,834	82.2	321,324	104.5	7,121,291	97.7	1,659,975	4.29
May.....	6,595,440	99.4	453,938	79.5	333,200	104.9	7,382,578	98.1	1,666,496	4.43
June.....	6,239,674	97.1	452,528	81.8	323,100	105.1	7,015,302	96.3	1,635,269	4.29
2nd Quarter.....	19,180,247	98.4	1,361,300	81.2	977,624	104.8	21,519,171	97.4	1,654,049	13.01
1st 6 months.....	37,861,310	97.7	2,798,914	83.9	1,875,699	101.1	42,535,923	96.8	1,644,218	25.87
July.....	6,345,315	95.7	453,686	79.6	345,957	96.6	7,144,958	94.5	1,616,506	4.42
August.....	6,414,637	96.5	467,293	81.8	345,725	96.3	7,227,655	95.4	1,631,525	4.43
September.....	6,286,855	97.9	437,961	79.4	332,703	95.9	7,057,519	96.4	1,648,953	4.28
3rd Quarter.....	19,046,807	96.7	1,358,940	80.3	1,024,385	96.3	21,430,132	95.4	1,632,150	13.13
9 months.....	56,908,117	97.3	4,157,854	82.7	2,900,084	99.4	63,966,055	96.3	1,640,155	39.00
October.....	6,750,829	101.5	461,897	80.9	366,788	102.2	7,579,514	100.0	1,710,951	4.43
November.....	6,371,750	99.0	458,469	82.9	349,593	100.5	7,179,812	97.8	1,673,616	4.29
December.....	6,471,261	97.6	475,204	83.4	358,075	100.0	7,304,540	96.6	1,652,611	4.42
4th Quarter.....	19,593,840	99.4	1,395,570	82.4	1,074,456	100.9	22,063,866	98.2	1,679,137	13.14
2nd 6 months.....	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96.8	1,655,653	26.27
Total.....	76,501,957	97.9	5,553,424	82.6	3,974,540	99.8	86,029,921	96.8	1,649,979	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,498,022 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, electric 4,225,890 net tons.

* Revised January through December, 1942.

June totaled 7,027,101 tons, substantially below the May total of 7,545,379 tons and only slightly in excess of June 1942 when 7,015,302 tons were produced.

Despite that drop, steel output in the first six months of this year exceeded by 1,331,000 tons the total produced in the first half of last year, and also was above the total of 43,493,998 tons produced in the last half of 1942.

Over the past six months, the steel industry has operated at an average of 97.9 per cent of its rated capacity, although in June the rate of operations averaged only 94.6 per cent. By comparison, the industry operated at 96.8 per cent of capacity in both six-month periods of 1942. Steel operations averaged 98.4 per cent of capacity in May of this year, and 96.3 per cent in June a year ago.

During the month just ended, the industry produced an average of 1,638,019 tons of steel per week, compared with average production of 1,703,246 tons per week in May and 1,635,269 tons per week in June 1942.

Electric steel output in June was second best on record, exceeded only by May, 1943.

Plate Shipments In June Show Decline

• • • The Steel Division of WPB announced last Thursday that because of the coal strike, steel plate production in June, a 30-day month, showed a decline as compared with May. Shipments for the month totaled 1,056,000 tons, a drop of 58,835 tons from May shipments of 1,114,920. Shipments in June, 1942, totaled 1,050,962 tons.

Included in the June shipments were 508,534 net tons produced on continuous strip mills, converted to plate production; 431,565 tons produced on sheared mills; and 115,986 tons produced on universal mills.

Total steel plate production by months since January, 1942, has been as follows:

(Net Tons)			
1942			
January ..	754,522	July	1,124,118
February ..	758,723	August	1,097,866
March	878,726	September ..	1,061,836
April	895,971	October	1,101,382
May	1,012,194	November ..	1,013,599
June	1,050,962	December ..	1,060,039
1943			
January ..	1,135,413		
February ..	1,072,001		
March	1,167,679		
April	1,121,647		
May	1,114,920		
June	1,056,000		

Scranton Prepares for Industrial Rebirth After Bomber Wing Plant Gets Approval

By J. HAROLD BRISLIN
of the "Scranton Times"

Scranton, Pa.

• • • Scranton has given up the idea of becoming a ghost town.

Instead, the hard coal city in northeastern Pennsylvania is prepared for a rebirth of its industrial prosperity and is already experiencing the beginning of a boom.

Only last March 25 Scranton was the subject of an article in THE IRON AGE which told of the city's desperate struggle for industries and its failure, up until that time, to gain recognition and a place in the war production effort. Today, thanks partly to the article which served to focus attention on the unused facilities of Scranton, two big war plants are preparing to begin operations and to supply employment for upwards of 9000 of the city's unemployed.

Assignment of the two plants to Scranton—a bomber wing factory operated by the Murray Corp. of America and scheduled to employ more than 7000 and a piston ring plant operated by the Wilkening Mfg. Co.—has brought about an almost miraculous revision in the city's industrial condition.

Where a surplus of 30,000 workers once existed in the Scranton-Wilkes-Barre region, a shortage of workers looms as a possibility. Where vacant homes by the thousands were going begging landlords are collecting rent or preparing houses for new tenants.

Migration of Scrantonians to war production centers such as Bridgeport, Hartford and Baltimore has stopped and thousands of Scranton workers employed elsewhere are attempting to obtain releases in order to return home to work in one of the city's new war plants.

The smaller of the two new plants is scheduled to begin producing piston rings for military aircraft around Aug. 1 in its brand new building in South Scranton. Approximately 1400 will be employed at the outset.

The bomber wing plant, now under construction, is scheduled to be completed around Sept. 1. Funds for both projects were provided by the federal government and representatives of the Defense Plant Corp. supervised the piston ring plant and are now watching the work on the huge Mur-

ray plant, which will cover nearly 20 acres.

Solution of the unemployment problem in Scranton came only after two years of heartbreaking struggle during which the government repeatedly raised the hopes of the city only to dash them to the ground by failing to locate plants in the erstwhile "anthracite capital of the world."

The problem actually was not solved until mid-June when final approval was given in Washington to the erection of the bomber wing plant. Approval came only after several anxious weeks during which the

• • • This is an unsolicited article by an outside writer who has been in close touch with the Scranton industrial situation, which took a turn for the better in mid-June. Earlier this year, THE IRON AGE had turned the spotlight on the plight of the city.

industrial future of Scranton hung in the balance.

Scranton and Pennsylvania officials have gone all-out in co-operating with the new defense plant and the facilities of the DPC have been made available so that the bomber wing plant can be erected quickly.

The DPC arranged for the shipment to Scranton of a concrete mixing plant. More than 1500 workers will participate in the construction job and an unlimited supply of trucks and other building equipment has been placed at the disposal of the Esslinger-Misch Co., general contractors. The plant is going up fast.

One of the most encouraging things about the way Scranton is greeting its new era of industrial prosperity (prosperity which disappeared when the "black diamonds" began to vanish from its hard coal mines) is the wholehearted co-operation being given by the labor unions.

Unions which are supplying workers for the contractors are pledged to restrain from strikes for higher wages. This is probably a wise pre-

caution upon the part of union leaders because the people of Scranton are in no mood to allow any union to interfere with the erection and operation of plants which mean so much to the community.

Through the co-operation of state and local armory officials the huge Col. L. A. Watres Armory in Scranton has been turned over to the Murray Corp., the Esslinger-Misch Co. and DPC representatives for use as general offices. Only a nominal rental is being paid for the big building.

What looms most important in the minds of local civic leaders who helped to bring the two plants to Scranton is the fact that both plants appear to have excellent possibilities of becoming permanent additions to Scranton's industrial life.

The Wilkening piston ring plant can quickly change to the production of automobile piston rings when the need for military aircraft in tremendous numbers ends, it is said. The Murray plant will have a more difficult time adjusting itself to peacetime production but it is understood the corporation, which has its main operations in Detroit, planned to begin manufacturing a new type of cooking stove just before the United States was drawn into the world conflict.

Murray officials are reluctant to discuss the possibilities of after-war production in Scranton but according to reports from good sources the corporation has been anxious to establish itself near big centers like New York and Philadelphia.

Up until the time this article was written more than 12,000 applications have been received for jobs with the Murray Corp.

Since THE IRON AGE told of Scranton's plight an actual shortage of female workers has been experienced and the abnormal supply of male workers has been reduced.

The Chamber of Commerce, which recently put across a drive for \$25,000 for the Greater Scranton Foundation Fund, is ready to launch another campaign for new industries as soon as the Wilkening and Murray plants are functioning and data can be collected as to the remaining idle manpower in the community and neighboring towns.

Incidentally, since the establishment of the fund, which is used for industrial development purposes, 36 new industries of all types and sizes have been located in the city and 14,000 have or soon will be supplied with jobs. The annual payroll of the 36 firms is estimated to be at least \$18,000,000.

Truman Committee Criticizes Curtiss-Wright in Report on Aircraft

Washington

• • • A report released last week by the Truman Committee recommends renegotiation of contracts obtained by Curtiss-Wright Corp., and declares that the corporation's Lockland plant "is a glaring example of the concentration of contracts in large plants with inexperienced management trying to get out a large production on a fixed-price contract and ruthlessly slashing quality to maintain production and schedules in the face of excessive production costs caused by poor management."

In this connection the committee said the corporation had enjoyed "spectacular and unprecedented success" in obtaining contracts, receiving, with the exception of General Motors, more war contracts than any other concern, obtaining from June 1, 1940, to March 1, 1943, contracts amounting to \$4,717,500,000 out of a total of \$104,953,400,000.

The report said that the Army had concentrated on P-40 Warhawk fighter planes, which were "relatively obsolete when we entered the war." Now, the report said, the Army has agreed to quit production of the P-40's and to substitute a better plane, but "the committee regrets the earlier decisions which concentrated so large a portion of our production on a plane which, through usable, is regarded by the Russian, English and American forces as at best a second choice."

An "unfortunate decision," the report said, was made in selecting the Curtiss-Wright experimental dive-bomber, known as the Helldiver, to manufacture in quantity.

In a statement made public July 10 taking issue with the report, G. W. Vaughan, president of Curtiss-Wright, said Curtiss-Wright management and employees feel that the performance of their equipment in combat speaks for itself. He declared the company did not seek the expansion it has undergone since the beginning of the war, but undertook it at the request of the government and as a patriotic duty. "It is inevitable in such a gigantic effort that some mistakes have been made, but they have in no way affected the finished products." Further, the P-40 "has been continuously modernized since our entry into the war and it has been the backbone of the U. S. Army fighter squadrons,

with a very successful record in every theatre of the war." Also, "the company emphatically denies that the Wright Aeronautical Corp. has at any time sold or delivered to the government, or any one else, products known by the company to have contained defective or sub-standard parts."

After discussing at length the troubles encountered by Ford Motor

Co. in getting into aircraft production, the committee said it had been informed that recently great progress had been made at Willow Run.

Most of the principal types of Army and Navy aircraft are discussed individually in the committee report. Difficulties of the Martin B-26 are examined.

Meanwhile, dispatches from the Mediterranean theater of war late last week indicated that the Allies are using a new fighter-bomber, known as the A-36, developed from the North American Mustang.

Ickes Diverts Coal to Steel Mills

Washington

• • • Coming in the midst of the WPB "Share-the-Steel" drive the strike of coal miners in western Pennsylvania has become so serious in halting steel output that Solid Fuels Administrator Ickes on Tuesday resorted to war powers to divert coal from other users to steel makers in this great steel production center. Orders were issued by Ickes requiring 13 coal producers in the Appalachian field to transfer 22,500 tons of coking coal daily to steel plants ordinarily served by western Pennsylvania mines.

Beginning July 12 the shipments are to be continued for 6 days. This

means the diversion of more than 135,000 tons of coal from steel plants and other users who have adequate stocks or who can use other coals.

The coal is being diverted to plants of the Republic Steel Corp., Weirton Steel Co., Jones & Laughlin Steel Corp. and the Carnegie-Illinois Steel Corp.

Mr. Ickes said that the emergency shipments are expected to return all of the steel plants to full production with the exception of the huge Clairton by-product coke plant of the Carnegie-Illinois Steel Corp. He added that an effort is being made to obtain enough emergency coal to return this plant to full operation.

License Fee Altered on Enemy Patents

• • • In view of the steadily growing demand for licenses under patents seized from enemy owners, Alien Property Custodian Leo T. Crowley announced on July 9 liberalized terms for the issuance of licenses. Beginning Aug. 1, 1943, the fee for obtaining a license to use enemy owned patents held by the Alien Property Custodian will be a flat \$15 for each patent. Hitherto, licenses have been issued for a fee of \$50 for a single patent plus \$5 for each related patent included in the same license.

(In last week's issue of THE IRON AGE, a partial list of several hundred seized patent applications of value to the metals and metalworking industries was printed. Lists of seized patents will also be published in THE

IRON AGE if sufficient reader interest is shown.)

The new arrangement, Mr. Crowley said, will make it easier for small manufacturers to put single patents promptly to work.

Main effect of the change will be to streamline procedures necessary to put seized patents to work in American industry. In the past considerable time has had to be devoted to determining whether several patents covered by a single application were in a "related" field. Under the new system the class similarity of patents covered by an application will not have to be considered.

Around 40,000 patents and patent applications are now held by the Alien Property Custodian. They are available under license on a non-exclusive, royalty-free basis for the life of the patents.

Share-the-Steel Drive Will Not Affect Physical Inventories; Some Cut

New York

••• "There is no physical removal of inventory connected with the 'Share-the-Steel' plan," declared A. Oram Fulton, WPB Steel Division representative of the drive in Region II during an interview here last week. "All we are asking is that some steel allotments be returned for re-allocation to users needing the material."

At the close of the first week of the drive, John T. Whiting, new chief of the WPB Steel Division said that about 75,000 tons of steel had been recovered for re-allocation and latest reports at weekend indicate that this figure has now increased. These early

stated that the campaign was planned to end about July 20. The effects of steel expansion and SRC facilities, of course, will be felt throughout the year, he said.

The drive to reallocated tonnage, according to Mr. Fulton, is one which should make available additional ingot tonnage for use wherever most urgently needed. The records of a steel consumers' requirements for the quarter are balanced against his actual use of material in the past three months, his present rate of use and his inventory and allotted steel already placed on mill order books. By this process the consumers' supply

LINE NO.	MONTH	REPORT ALL FIGURES IN NET TONS TO THE NEAREST TON						CWP ORDERS SUBMITTED TO PRODUCERS AND ACCEPTED	CWP ORD SUBMITTED TO PRODUCERS UNACCEPTED
		TO BE PUT INTO PRODUCTION	PRESENT RATE OF USE	TOTAL USE CAPACITY	TOTAL USE (Last 3 months available)	INVENTORY UNFABRICATED AND IN TRANSIT	MATERIAL IN PROCESS		
1	2	3	4	5	6	7	8	9	10
1	JULY	800	XXXX		XXXX	XXXX	XXXX	900	
2	AUGUST	800	XXXX		XXXX	XXXX	XXXX	1000	
3	SEPTEMBER	800	XXXX		XXXX	XXXX	XXXX	1500	
4	OCTOBER		XXXX		XXXX	XXXX	XXXX		
5	NOVEMBER		XXXX		XXXX	XXXX	XXXX		
6	DECEMBER		XXXX		XXXX	XXXX	XXXX		
7	USE FOR COLUMNS 4, 6, 7, AND 9	XXXX	750	XXXX	2400	1500	1000	XXXX	

results were considered highly satisfactory as this tonnage was produced from only a few score of manufacturers while the plan involves the combining of over 2000 large consumers' requirements by a staff of about 400 WPB regional men.

Since the return of allotments is closely tied in with the amount of inventory carried by the steel user some confusion has existed following statements that a part of the added 2,000,000 tons of steel to be produced by the drive would come from inventories. This thought is discredited by Mr. Fulton who explains that no physical movement of inventories will occur although in some cases a voluntary reduction of inventory may be asked. Some steel users, particularly those producing repetitive products and capable of working a little closer to the belt are being asked to limit inventories to a 45-day supply instead of the permitted 60-day inventory.

Emphasizing that at least the re-allocating phase of the drive was to be a "one-shot" activity, Mr. Fulton

and demand for steel is analyzed and that which definitely appears to be an excess is asked to be returned. This is done by the consumer returning the allotment received from his Claimant Agency and canceling the order for the steel with the mills. Thus, mill schedules will be cleared somewhat and the Requirements Committee of WPB will have an opportunity of reallocating the tonnage represented—not the actual product originally involved. Excess allotments of bars after canceling may be converted to plate tonnage when reallocated which makes for complete flexibility in re-allocating material and will permit greatest efficiency in relieving emergency steel needs.

To further illustrate how the analysis of the consumer's picture is made by WPB field representatives, Mr. Fulton prepared a graphic presentation. (See reproduction above taken from Form WPB-3028 used for the report by the consumer.)

This mythical consumer of steel reports in Column (b) that he requires

800 tons monthly or 2400 tons quarterly for production. Column (c) also reveals that at the present rate of production the consumer only uses 750 tons per month. He reports a total use in the previous three months of 2400 tons which balances well with his stated requirements of 2400 tons for three months. Also weighted against these requirements and use figures is 3400 tons that have been allocated and placed on mill schedules for delivery and 1500 tons in inventory. In the analysis of these figures the WPB man adds inventory to allotted material for a total of 4900 tons for three months. Deducting from this total the 2400 tons which the consumer reported actual use of in the previous three months, an excess of 2500 tons shows with all inventory utilized. Allowing the consumer a 45-day—instead of 60-day—inventory which would be 1200 tons as opposed to 1500 tons there still remains about 1300 tons of steel suitable for reallocation without jeopardizing the consumer's production schedule.

Actual return of the allocation is voluntary as the steel has been legally allotted to the consumer. Cancellation with the mill is likewise handled by the consumer but is compulsory once an allotment has been returned. The consumer also chooses the material which he wishes to cancel as WPB goes no deeper into the records than to ascertain carbon and alloy tonnages involved without thought for product involved. Form WPB-3027 is used in notifying WPB of the return of an allotment and states that the mill cancellation has been made of the material represented by the returned allotments.

Three-Bid Restriction Favored by Coke Oven Firm

••• The Koppers Co. does not concur in the complaint about government restrictions relative to competitive bidding, mentioned in the coke oven story last week on page 107 of this magazine. According to G. M. Carvlin, assistant vice-president, Koppers favors the DPC requirement of making purchases on the three-competitive-bid basis.

"We have found that wherever good reasons can be shown for purchasing from other than the lowest bidder, approval is readily granted," he said. "Where it is impossible to obtain more than one we have invariably received prompt approval to purchase from the single bidder when the facts are presented."

American-British Metallurgical Cooperation On Alloys to Be Revealed

Washington

• • • American-British cooperation in metallurgical fields will bear fruit this week when technical groups meet here to carry out a recommendation with respect to alloy turning segregation made by a joint committee appointed by former Steel Director H. G. Batcheller.

Studies carried on both in this country and Britain revealed that while English alloy recovery methods are superior to those of the United States, the British have been using richer alloys than necessary to provide comparable physicals of American steels. Standardizing of grades of steel and metallurgical nomenclature has been decided upon with broader exchange of technical information for the future.

Quincy Bent, Bethlehem Steel Co. vice-president in charge of operations, is chairman of the group which includes governmental and industrial representatives from the United States, Great Britain and Canada.

United States industry members are: Dr. Charles Hertzy, Bethlehem Steel Co.; F. B. Lounsbury, Allegheny-Ludlum Steel Co.; John Mitchell, Carnegie-Illinois Steel Corp.; R. A. Geselius, General Steel Castings Co.; L. P. McAllister, Lukens Steel Co.; A. D. Shankland, Bethlehem Steel Co.; James W. Kinnear, Carnegie-Illinois Steel Corp.; Earl C. Smith, Republic Steel Co.; C. E. Tuttle, Rustless Steel Co., and G. S. Rose, of the American Iron and Steel Institute.

British members are: C. R. Wheeler, Deputy Controller of the British Iron and Steel Control; William Bair, D. L. Burn, H. H. Burton, W. H. Hatfield, E. A. Oliver and T. Swinden. Members from Canada are: J. C. Morrow, Steel Co. of Canada; Howard Biers and R. H. Davis.

Representing the American government are: The chief and assistant chief of the WPB Steel Division, Metallurgical and Conservation Branch, H. J. French and E. J. Hergenroether and George B. Waterhouse, technical consultant of the Lend-Lease Administration.

To illustrate the need for greater efforts in segregating alloy scrap, approximately two-thirds of every ton used in munitions-making becomes

scrap. That there is room for improvement in American methods is seen by the fact that British methods recover 41 per cent molybdenum and 58 per cent nickel, whereas American recovery of these metals is only 36 and 45 per cent respectively.

The laxity of segregation is shown by the increasing number of reports of shipments of alloy-bearing scrap from arsenals and war plants which have been billed as carbon steel. One prominent steel maker reports that the Watertown arsenal sent his mill several carloads of scrap designated as carbon which contained more than 1 per cent nickel.

To promote better segregation the committee has recommended that seven types of alloy turnings be color-graded. Mills will have to place color tags on the alloy groups selected and every time the steel is shipped thereafter it will be similarly tagged. Machinists will mark their machines and scrap receptacles with the color code. It has even been suggested that piles of turnings or other scrap be sprayed with color according to its analysis. A color code, similar to Britain's, will be adopted this week.

The alloy steels under the new color-code will be nickel types 1-5, under Schedule A of Order M-24-c.

Comfort Bred Steel Violations

• • • Misuse of about 360 tons of iron and steel for home-front comfort during a three-month period in the bedding products industry was reported July 12 after a survey conducted by the WPB Compliance Division. The Division selected for study 609 manufacturers, who had reported large inventories and who do an estimated 90 per cent of the business.

Of the companies investigated, 5 per cent had gone out of business; 32 per cent were serious violators of orders restricting the use of materials by a total of almost 250 tons of iron and steel. Only 10 companies were found to be violating the order which prohibits use of steel upholstery springs, these 10 had used 58 tons of metal illegally during the quarter.

A further alloy conserving recommendation made by the committee is that the United States mills adopt specifications calling for the greater use of ternary alloy chemical combinations of chrome, moly and nickel. The reason the use of ternary steel conserves alloying elements is that most alloy scrap contains these alloys and the use of triple alloy scrap in double alloy melts results in a waste residual.

The percentage of ternary steels of all Canadian alloy steel is approximately 50 per cent, according to WPB figures. The United Kingdom's percentage is 43, but in the United States only about 31 per cent of all alloy steel is within this chemistry.

As a result of another of the committee's findings, the British will thin down alloy mixture and adopt the American practice of water quenching alloys. Heretofore, the British put more alloying elements into their steel to enable them to quench with oil. The result was that more alloying elements were used to produce steels of the same physical qualities as American steels of lower alloy content.

Aside from recommendations with respect to standardization of marking and numbering of steels and color grading scrap, the committee thought that American and British Ordnance should be tested on each Ally's armor to determine the relative excellence of both the shells and the armor.

WPB Requests Use Of Construction Guide

Washington

• • • Requirements for construction projects should be in line with the revised version of the "Critical Construction Materials Design Guide" prepared by the Conservation Division, the WPB announced.

WPB Must Approve Power Truck Orders Under L-112

Washington

• • • Purchase orders for used industrial power trucks must be authorized by the WPB before they can be accepted, in accordance with an amended Limitation Order L-112 issued July 12. Authorizations of acceptance are made on Form WPB-1319 (formerly PD-556).

Lend-Lease Alloy Steel Orders To Carry New Designating Symbols

Washington

• • • Subcontractors of alloy steel have been notified to affix designation symbols, in addition to allotment numbers, to all Lend-Lease orders for drop forgings, tubing, and cold drawn material. Alloy steel producers, however, will be required only to give the allotment numbers on the record of orders.

This information has been sent to all alloy steel producers by James F. Reid, Sr., chief of the Alloy Steel Schedule Section, Steel Division. His letter reads as follows:

"At the present time, your scheduling department is identifying Lend-Lease tonnages as entered on Form PD-391 Alloy Steel Melting Schedule by either United States Treasury Department DA-TPS contract numbers or by steel allocation reference numbers, series "L." In several instances Lend-Lease tonnages also have been identified only by CMP-Allocation code reference, as for example, CMP-

L-19 or CMP-L-2-19. Will you please advise your scheduling department to record entries against prime contracts covering Lend-Lease tonnages, for direct shipment to the Soviet and British Empire, by requisition number instead of DA-TPS contract numbers or the various other references noted above. These entries shall appear in column 1 on WPB-2933.

"To identify sub-contracts issued to you as purchase orders from prime contractors of Lend-Lease drop forgings, tubing, and cold drawn material, we are asking these sub-contracts to identify the Lend-Lease requisitioning agency by adding either "LLS" or "LLB" to their purchase order numbers, which suffix represents respectively Soviet and British Empire sub-contracts. We are also asking them to identify by the corresponding Soviet or British requisition number on all forms, letters and other media of correspondence they may have with you. These entries shall appear in column No. 1, WPB-2933."

PD-IX Replaced By New WPB Form

Washington

• • • Form PD-1X—used by distributors in obtaining priority assistance for replacing inventories—has been superseded by a new, simplified application titled WPB-547, the Wholesale and Retail Trade Division of WPB. announced last week.

Steel Valves Subject To Redistribution Action

Washington

• • • WPB last week moved to relieve a critical shortage of new steel valves needed for some of the nation's vital war programs, such as shipbuilding, high octane gasoline and synthetic rubber. The WPB Redistribution Division is calling upon all users of new high pressure steel valves to list their surplus items, in sizes of 1/4 in. and upward. "Surplus" valves are defined generally as those which the present holder will not require for use before Nov. 1. This redistribution program is being carried on with the cooperation of the Army, Navy, Maritime Commission, PAW and Of-

fice of the Rubber Director, and other Claimant Agencies, as well as the manufacturers of steel valves.

Surplus valves that are to be moved into or out of the hands of private owners will be purchased by Metals Reserve Co. through its agency, Murray Cook, at market prices, and resold to steel valve manufacturers to help them meet orders now on their books. The extra transportation costs involved in such movements will be borne by MRC. Holders unwilling to sell their surplus stocks are asked to state their reasons.

CSP Becomes Kin to CMP

• • • Component Scheduling Procedure (CSP) is viewed as having formally taken its place along side CMP in the War Production Board with the appointment last week of Robert M. Hatfield, formerly of Combustion Engineering Corp., as its director. Mr. Hatfield heads the new WPB Production Scheduling Division under the direct supervision of J. A. Krug, program vice-chairman.

The new form, copies of which are now available in WPB field offices, can be used immediately if desired. PD-1X applications will be accepted for processing until August 1; after that date, only the new WPB-547 will be valid.

Foy, Block, Honeycutt Shifted At WPB Steel Branch

Washington

• • • Norman W. Foy, general manager of sales for Republic Steel Corp., has been appointed deputy director of the WPB Steel Division by Director John T. Whiting. Mr. Foy formerly was assistant director and chief of the program and distribution branch which performs the division's requirements function under CMP.

Succeeding Mr. Foy is Joseph L. Block, executive vice-president of Inland Steel Co. Before assuming his new duties, Mr. Block was chairman of the powerful production directive committee. The production directive committee establishes through conference the tonnage of steel products mills shall make each quarter.

In another shift, Jesse Honeycutt, Bethlehem Steel Co., sales vice-president, takes over as assistant director in charge of the production branch, largest and one of the most important branches of the division.

Mr. Honeycutt replaces David F. Austin, Carnegie Illinois executive who resigned recently. The wire and heavy products branch was Mr. Honeycutt's previous assignment.

Charles H. Longfield, vice-president of the Youngstown Sheet & Tube Co., has been made chairman of the production directive committee. Mr. Longfield formerly headed up the tubular products and tin plate branch.

A new position, assistant director for manpower, has been created which will be filled by Harold J. Ruttenberg, CIO Research Director. Mr. Ruttenberg acted as special assistant to the division director up to the time of his appointment.

Boiler Quotas Changed

Washington

• • • WPB on Saturday ordered low pressure cast iron boiler production back to 1940 levels for the rest of the year in an amendment to Order L-187. The amendment was necessary because L-187 prohibited the manufacture of these boilers after July 1. Form PD-704 is still required for military, war housing and hospital use.

CMP Overcoming PRP Habits In Steel; Less Confusion Reported Than With PRP

Pittsburgh

••• This week marks the second in which CMP has become mandatory and there are still those who praise it and those who damn it. The former are gaining in number over the latter. So much educational work was done prior to the formal promulgation of CMP that industry has moved over into the new system with less dislocation and confusion than occurred when the Priorities System was inaugurated.

Complaints to steel mills on deliveries have dwindled rapidly in the past few months as consumers became more familiar with CMP workings. Major headache recently has been the number of carryover orders which have displaced certain tonnages in the following month. Many of these carryovers can be traced to production difficulties such as repairs, effects of coal strikes, etc. Nevertheless, an impartial view indicates that current conditions are in far better shape steelwise than was the case under the Priority System.

WPB officials have repeatedly pointed out that when CMP becomes smoother there will be little necessity for excessive or even large inventories. From a practical steel point the benefits of smaller inventories are far greater than any described by WPB officials. In the first place, the utilizing of existing inventories to a greater extent through the "share the

steel" program will probably give the steel industry a well-earned breathing spell. It will put steel companies in a position to at least partially satisfy some of the most insistent customers who have been side-tracked by other consumers who may now be in a position to "stretch" the use of their inventories.

While it is true that demand for steel for strategic war purposes is still greater than the apparent supply, it must be admitted that the whole steel picture is in the best balance since the war began. It will take time, it is said, to get certain steel consumers out of the "bad habits" they got into under the Priorities System. Through PRP a terrific pressure with changing priorities plagued both buyer and seller. It will take a few months at least to impress upon consumers that the "grand rush attitude" will get them nowhere under CMP. There are some impartial steel observers who believe that Claimant Agencies requirements have been inflated to some extent and could still stand a little "wringing."

If there is any attempt, in the drive to make more steel available, by moving up the percentage by which orders may be taken, this will probably only serve to confuse the picture. At the present time steel mills are allowed to take up to 110 per cent of their WPB product directive which is another way of saying, approximately 105 per cent of their ability to produce. The WPB product directive is 95 per cent of capacity and 110 per cent of that is approximately 105 per cent of capacity. Carryovers have been mounting in many steel plants, hence any step-up in the allowable percentage by which steel companies may accept orders would only be a mathematical illusion, since steel companies are producing all they can.

It is believed in steel circles here that a more comprehensive and speedy review of certain type steel specifications insisted on by some of the Claimant Agencies with an attempt to revise these closer to actual job requirements might go a long way in speeding up steel production and shipments.

One healthy sign recently has been the series of CMP meetings held throughout the country by WPB officials in conference with steel men

who control product scheduling. The WPB officials asked for and encouraged suggestions as to CMP shortcomings. This frame of mind has already paid dividends.

Special Allotments Granted Subcontractors

Washington

••• WPB has made a modification in the controlled materials allocation system to permit a direct allocation to subcontractors engaged in Class A products. These will be made by WPB when such a subcontractor fails to receive allotments from his customers in time to permit him to make full use of his allotments of controlled materials.

The new plan is covered by Direction 22 to CMP Reg. 1. It provides that special allotments will not be granted except in extraordinary cases of urgent need. Usually manufacturers applying for special allotments will be either those who are several steps removed from a prime contractor, and where unavoidable delay is involved, in passing allotments down, or those engaged in long cycle operations whose customers are not able to furnish them with advance allotments. Such special allotments will not be granted to prime contractors.

A subcontractor receiving a special allotment must not use any allotment received from his customers to purchase controlled materials. The special allotment must be deducted from any prior allotment which may have been assigned by the prime contractor.

Additional CMP Developments

• Direction 20 to Reg. 1 waives the requirement that full delivery details be furnished when export orders are placed in the case of Lend-Lease and Board of Economic Warfare orders. (Release No. TCS-307)

• Direction 9 to Reg. 5 allows hand tools available under MRO allotments as maintenance, repair and operating supplies to be transferred to employees. The regulation permits this where the tools belong to the employer and are only checked out to the employee and also where the tools are to be resold by the employer to the employee.

• Direction 21 to Reg. 1 holds that a retailer who receives an order for copper wire supported by a "Copper Wire Allotment Certificate," issued to a farmer by a County USDA War Board, may treat the certificate just as though it were an allotment.

Price Briefs

• Amendment 1 to Max. Price Reg. 2 places maximum prices on primary grade aluminum ingot—a new grade of ingot made by blending from 50 to 70 per cent of scrap with primary metal. (Release No. TCS-337)

• Amendment 2 to Max. Price Reg. 251 makes provisions for the individual adjustment of maximum prices for contractors supplying construction services or who install building and industrial equipment in local shortage situations. (Release No. TCS-325)

• Amendment 2 to Max. Price Reg. 20 establishes a ceiling on toll charges for conversion of copper scrap and copper alloy scrap. (Release No. TCS-355)

• Amendment 95 to Max. Price Reg. 136 withdraws the limitation on the effective period of a provision in the machinery price regulation which permitted wholesalers to adjust their maximum prices on certain items if they were based on lower manufacturer's prices than those in effect to them on Oct. 1, 1941. This also applies to machines and parts listed in "Appendix B" of the regulation. Effective date of the order is July 23. (Release No. TCS-371)

Copper Wire Supply Eased to Farmers

Washington

• • • WPB on Monday announced a simple method for use by retailers and warehouses in supplying copper wire to farmers under CMP. At the same time the board ruled that copper wire and cable in distributors' stocks are no longer subject to inventory restrictions as it amended L-62, suppliers' inventory limitation.

In order to obtain copper wire in excess of the 75 ft. permitted under Priorities Regulation No. 19, farmers may obtain "Copper Wire Allotment Certificates" which are issued by county USDA War Boards on the basis of applications which show actual need of copper wire for farm operations. Application forms will be obtainable from the county USDA War Boards.

Retailers who receive orders for copper wire supported by such certificates have two alternative methods, only one of which may be used during any one month, by which they may obtain wire under Direction No. 21 to CMP Regulation No. 1.

Retailers may place orders on warehouses or mills for the amount of copper wire shown on the certificate, which must be attached. The order is then an authorized controlled material order for the purpose of CMP regulations.

If the retailer prefers, he may place an authorized controlled material order for the amount of wire shown on the certificate by placing on his order the allotment certificate, followed by the quarter identification (3043 for the third quarter of 1943) and endorsing the order with a certification that is provided.

Retailers must fill orders in the order in which they are received and must give preference to such orders over orders which are supported by preference ratings alone.

Warehouses must treat orders as though they were authorized controlled materials orders under CMP.

Exemption from L-63 of copper wire and cable in distributor's stocks covers any "bare or insulated wire or cable for electrical conduction made from copper or copper base alloy."

As a result of this action, suppliers are not limited in the amount of copper wire and cable they may purchase, but sales of such materials cannot be included in their computations

of maximum permissible inventories as determined by L-63.

However, it was pointed out that deliveries of copper wire and cable from warehouses are subject to CMP Regulation No. 4. Replacements of these inventories are made in accordance with instructions or directives sent directly to warehouses by WPB.

Simplified Practices Eased On Government Specifications

Washington

• • • Interpretations of two WPB limitation orders issued on Monday permit departures by manufacturers from simplification programs only when the Army, Navy or other Claimant Agency directly prescribes specifications.

L-272, simplifying control valves,

Priority Changes

L-63—Copper wire and cable in distributors' stocks are no longer subject to inventory restrictions of the order as amended. (7-12-43)

L-65—Amended order permits unlimited production to fill preferred orders on coffee makers, flat irons, air heaters, water heaters and commercial or heavy duty equipment. (7-8-43)

L-126—Schedule 1, as amended, permits production of special self-contained drinking water coolers for an indefinite time for use aboard ship. (7-9-43)

L-140-a—Amended order increases the amounts and types of cutlery to be channeled to the armed services and to essential civilian usage. (7-2-43)

L-161—Interpretation No. 1 prohibits the use of copper or its alloys on metal exterior threaded ends attached to the fiber of renewable electric fuse tubes and washers used to hold fuse links in renewable fuses. (7-10-43)

L-172—Amended order brings under strict control of WPB additional types of heat exchangers so as to channel critical types and sizes into essential war industry and military use. (7-9-43)

M-21-c—Revoked. (7-5-43)

M-21-d—Amended order permits the use of stainless steel on authorized controlled material orders. (7-5-43)

P-98-b, c—Both orders amended for the purpose of blanketing the petroleum orders and setting up rules for obtaining materials. (7-10-43)

P-141—Revised order deletes references to sanitation services other than sewers, and other provisions are brought up to date to conform with CMP. (7-5-43)

CMP-4 Under Revision

• • • The warehouse order, CMP Regulation No. 4, is reported under revision. Most important change expected is the extension of the time limit permitted for delivery from a warehouse after the close of any quarter from the present 15-day period to 30 days. This is to allow for warehouse service operations such as shearing, punching, etc.

regulators and other industrial instruments, prohibits the manufacture of non-standard items except where required by specifications of a claimant agency. L-203, in order to encourage standardization of electrical measuring instruments permits manufacturers to accept without preliminary WPB approval purchase orders for less than 500 instruments which conform to standards cited in the orders or to service specifications.

Government to Tap Used Idle Welding Equipment

Washington

• • • Emphasizing that reserves of used idle resistance welding equipment must be tapped first to meet demands before new equipment can be purchased, WPB on Monday issued L-298 which sets up procedure for establishing the pool by requiring owners of used idle equipment to register it with WPB. Equipment is considered "idle" when it has not been used for welding operations more than 120 hr. during a period of 90 consecutive days. Such equipment is registered on Form WPB-2732. There is no provision in the order requiring owners to sell their equipment.

Brass Distributors Form New Association

Chicago

• • • More than fifty representatives of brass mill products distributors meeting at the Palmer House here Monday, voted to organize an association to be called the Brass Mill Products Association. The association was formed to provide representation for the distributors in Washington, etc. J. H. King, Seaboard Brass & Copper Co., Baltimore, acted as chairman of the meeting. Committees were appointed to arrange for the organization details and to nominate officers.



WAR'S TURMOIL and *Tomorrow's Living*

WAR WORK is the prime consideration of the Parish Pressed Steel Company today and every day.

But what of tomorrow? The war is being won, slowly but surely, and then it will devolve upon industry to insure full employment through the production of those items that make for better living.

Even now we are ready to discuss post war opportunities. And we can offer a wide range of services.

Steel Stampings have always been our major interest. And it should be emphasized that steel properly alloyed or properly surface protected provides a range of favorable characteristics not otherwise available. Included are low cost, resistance to the elements, ability to take hard knocks, resistance to fatigue, to shock, to temperature changes, and many others too numerous to mention.

Parish Pressed Steel Company is equipped also to stamp, fabricate and heat treat aluminum.

It is possible to incorporate plastics as integral parts in completed assemblies.

Parish Pressed Steel's complete rounded facilities include effective engineering in the drawing board stage—all sizes of presses for efficient production, both light and heavy—welding, painting and finishing departments—and full assembly facilities.

We solicit your inquiries, confident that we can render effective cooperation in the development of your products for tomorrow's better living.



PARISH PRESSED STEEL CO., Reading, Pa.

Subsidiary of SPICER MANUFACTURING CORPORATION

Western Representative: F. Somers Peterson, 57 California St., San Francisco, Cal.



METAL STAMPINGS

MODERN DESIGN

AT LOW COST

**JOEY
ON-THE-JOB
SAYS...**



JOMAC HEAT-RESISTING, LONG-WEARING GLOVES

They are proving themselves in hundreds of shops where workers must handle metals too warm to touch. The remarkable Jomac Fabric is a loop-finished cloth with air-cell "cushions" which allow breathing-space and an easy dissipation of heat. Jomac's loop finish gives extra protection to hands, extra long wear.

JOMAC REGULAR INDUSTRIAL GLOVES



A modern work-glove that is semi-heat resisting and gives as much as 7 times the service of ordinary work gloves. Jomac Fabric and its hidden lock-stitch keep the thick pile in place and provide extra strength and wear. Jomac Gloves can be washed repeatedly, kept clean . . . and thus minimize the dangers of dermatitis and other skin infections.

TEST THEM!

Just try JOMAC GLOVES on your stiffest jobs. Test them for heat-resistance, for wear, for washability, for economy, for increased production. Write for full details.

**JOMAC WORK
GLOVES**
C. WALKER JONES CO.

6135 N. Lambert St., East Germantown, Philadelphia 38, Pa.

NEWS OF INDUSTRY

Saga of CMP Enters Rubber Stamp Era

Washington

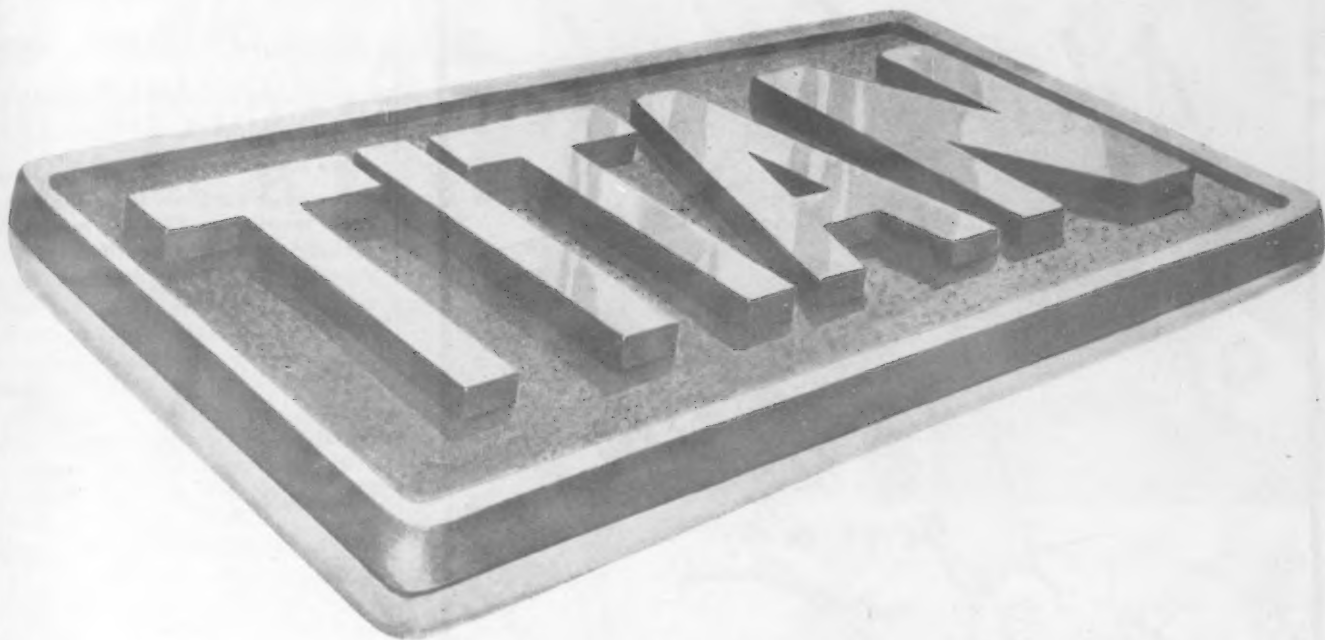
• • • Bureaucracy has reached its peak in America—the rubber stamp is now universally acceptable even on CMP paper work. A new amendment to Priorities Regulation No. 7, solemnized July 6, now makes it legal to use a facsimile signature on purchase or delivery orders wherever a signature is required by a WPB order or regulation. Now all you need is a rating for rubber stamps that will produce the goods.

New WPB Forms

Washington

• • • The following new questionnaires and statistical report forms have been issued by WPB:

- WPB-1477 Request for relief.
- WPB-2040 Non-ferrous smelters and refineries: Application for quarterly quota for maintenance, repair, and operating supplies for fourth quarter 1943.
- WPB-2939 Non-metallic mines: Application for quotas for maintenance, repair, and operating supplies for fourth quarter 1943.
- WPB-2938 Coal mines: Application for quarterly quotas for maintenance, repair, and operating supplies for fourth quarter 1943.
- WPB-788 WPB report available critical machine capacity.
- WPB-1040 Customs transaction certificate on imported strategic materials.
- WPB-1319 Application for authorization to effect a specific transaction restricted by orders of WPB.
- WPB-2967 Nickel plating solutions: Report on idle inventories.
- WPB-2958 Foundry application for copper, copper-base alloy ingot and scrap.
- WPB-1887 Steel drums: Appeal form to be used pursuant to Order L-197.
- WPB-1843 New floor finishing, floor maintenance, portable rug scrubbing or industrial vacuum cleaning machinery.
- WPB-1548 Plant facilities record for the joint use of the armed forces and the WPB.
- CMP-4C Application for allotment of controlled materials for construction and facilities.
- WPB-2206 Inventory record card—1043.
- WPB-2912 Vanadium: Statement of stocks, consumption and request for allocation. Monthly.
- WPB-1041 Application for authorization to contract or arrange for importation of strategic materials.
- WPB-1161 Application for authorization to make specific transactions in materials, used equipment and machinery restricted by WPB orders or regulations.
- WPB-2937 Metal mines: Application for quotas for maintenance, repair and operating supplies for fourth quarter 1943.
- WPB-2682 Ammunition: Application for specific authorization to purchase.
- WPB-2997 Steel tubing for aircraft engine bearings: Request and allocation.



GREAT NAME IN BRONZE SINCE 1915



**BRASS AND BRONZE RODS
FORGINGS, DIE CASTINGS
WELDING RODS**



It takes more than buildings and equipment to build a business. The talent and experience of the Men of Titan have cast and forged a Great Name in Bronze.

Again today, as in World War I, the exacting requirements of war are proving the mettle of men as well as the metal they produce.

Qualitatively and quantitatively, the Men of Titan are multiplying their metallurgical skill by expanded production facilities. They are contributing to the striking power of the fighting equipment which depends on the rare properties of brass and bronze alloys for many vital parts.

In looking ahead to Victory, the Men of Titan now offer post-war planners the experience and personal attention that helped build a Great Name in Bronze.

TITAN

**METAL MANUFACTURING CO.
BELLEFONTE, PA.**

A Great Name in Bronze Since 1915

Ask for this book



Tells you how to take care of small tools-Bolt Clippers, Files, Taps, Drills, etc. The boiled down facts to help you get the most out of these tools-use, wear, repair and selection. Handy pocket size. Just ask on a post card for- Porter's Tool Maintenance Book it's FREE

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PORTER CUTTERS

BOLT CLIPPERS — AUTOBODY REPAIR TOOLS — PRUNERS

H. K. PORTER, INC., 400 ASHLAND ST., EVERETT, MASS.

NEWS OF INDUSTRY

Accurate Reports On Steel Requested

Washington

• • • WPB insists it must have an accurate record of ingot production each month, as this is essential in making proper allocations of steel supplies. This notice has been sent to all steel producers. The letter reads:

"It is of the utmost importance that shipments of steel products be reported correctly on CMP-8, especially as such shipments are compared with ingot production in order to arrive at a yield from which the future supply of steel is determined for use in making quarterly CMP allocations.

"The tabulations made by the Census Bureau for the month of April 1943, disclose a considerable discrepancy between the total tonnages reported on Line 71 of Form CMP-8, 'Total Shipments Reported on PD-138,' and the total tonnages reported on Line 40, Column A of Form PD-138. The two tabulations must agree.

"The instructions on the back of Form CMP-8 at the bottom of Column 1 for Line 71, Total Shipments Reported on Form PD-138, in numerous cases were not observed. In several instances, on Form CMP-8 no tonnage was entered for the shipments reported on PD-138, although PD-138 reports were submitted and showed shipments. In other cases the tonnage shown on Line 71 of Form CMP-8 did not agree with that on PD-138 the tonnage shown in Line 40, Column A of Form PD-138.

"It is imperative that on reports for the month of June, the tonnage entered on Form CMP-8, Line 71, Columns A, B and C, is the same tonnage for the corresponding grades as shown on Line 40 of Form PD-138.

Action On Auto Parts

• • • Controlled materials for the production of auto replacement parts during fourth quarter of 1943 may be obtained on a CMP-4B application. This will include orders for the Navy, Coast Guard, or Marine Corps.

Credit for Cartoon

• • • The cartoon, "Women Heat Treaters," which appeared on page 114B of the July 8 issue was reproduced by courtesy of the Lindberg Engineering Co. which had used it previously in a publication of its own. The credit line was omitted by accident.

DOALL

MACHINES DO A JOB AT CONSOLIDATED VULTEE



At the Fort Worth home of B-24 Liberator Bombers and C-87 Liberator Express Transports. At left, Operator Jackson is making a bucking bar from a pattern drawn on a block of cold rolled steel. Above, he is cutting sheet aluminum. This is only one of many DoAlls in this modern plant. Jackson has been operating this machine for more than eight months and declares it is invaluable because of its fast precision cutting and the fact that it saves both time and metal.

MACHINE OF MANY USES

That's what Consolidated Vultee calls the DoAll, and it's a fact because

- ★ DoAll does internal and external cutting of metals, alloys, plastics, etc., following a hairline design with unerring precision
- ★ Cuts out production parts, jigs, dies, fixtures, cams, templates, special tools, etc.
- ★ Cuts out 100 or more shapes at one time from stacked sheets
- ★ Makes short runs of stampings or forgings
- ★ Cuts out blocks, sheets, bars or tubing
- ★ Relieves heavy machine tools for other work.

DoAll is on the job on regular production lines, in experimental rooms, tool rooms, repair departments. DoAll smashes bottlenecks—beats former time records—gets jobs through on time.

"DoAll on Production"—Interesting book, well illustrated, about DoAll performance in many plants. Write for copy today.

Investigate this modern machine that does hundreds of shaper, milling and lathe jobs in a fraction of the time.

CONTINENTAL MACHINES, INC.

1311 S. Washington Ave., Minneapolis, Minn.

DoAll Offices in 25 cities, each in charge of a trained sales engineer to give you quick service on Contour Machines, DoAll Band Saws and Files, Gage Blocks and Surface Grinders.

DoAll Surface Grinder

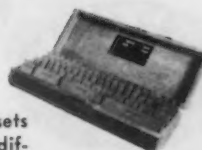


Gives "tool room precision" even on long-run grinding jobs. Two models. For wet or dry grinding.

DoAll Gage Blocks

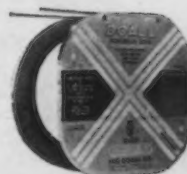
The foundation of uniform measurement.

81-piece sets made in 3 different accuracies.



DoAll Band Saws

A wide range of widths and styles. 100 feet in each Strip-out Container.



SAVAGE TOOL CO., Savage, Minn.

DOALL COMPANY, Des Plaines, Ill.

HERE ARE THE FIVE DOALL MODELS PRICED FROM \$1000 TO \$5000 Each Complete with Motor

Loading Another 5 TONS of ARMY POWER



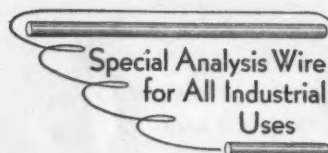
KEYSTONE Wire

Valuable time is gained loading this 5-ton package of Diesel power. A Tournacrane, equipped with several hundred feet of rugged cable, swings it quickly and easily onto the railroad car. Then comes another and another—ready for a quick trip to a battle area.

In the large number of such cranes located at key points, wire is at war. Wire mill production plays an integral role in planes, tanks, guns, ships and ammunition, too.

In these unglamorous ways, Keystone is devoting a major share of production to speeding Victory. Then we hope to be able to meet, at least partially, a towering, pent-up civilian demand.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS



In the scene above, three major uses of wire mill production are indicated: welding rod in producing the crane and tractor, rope wire for the cables, chain wire for the sling.



Continuing the Victory depends on MORE SCRAP!

NEWS OF INDUSTRY

Method Improved on Tool Allocations

••• On July 7, WPB moved to establish a simpler and more effective method of allocating machine tools to foreign purchasers and domestic purchasers other than those obtaining these tools through the armed services. This action was taken in an amendment to General Preference Order E-1-b, which also is designed to prevent the delivery of machines to distributors for stock on a consignment basis.

About 75 per cent of the machine tools manufactured in this country has been allocated to the armed services and their contractors. The remaining 25 per cent has been scheduled in accordance with preference ratings.

Two principal provisions of the amendment are:

1. It prevents the shipment, under any circumstances of machine tools to dealers for stock.
2. The sequence of delivery among the 25 per cent of production allocated to foreign and "other-than-Service" purchasers is now determined by the date of receipt of the preference rating certificate, whenever the rating is A-1-A or higher. If lower than A-1-A, deliveries are in accordance with preference ratings.

Price Rule Extended On Freight Car Materials

Washington

••• The effective period of the price regulation covering freight car materials sold by car builders was extended by the OPA to Dec. 31, 1943.

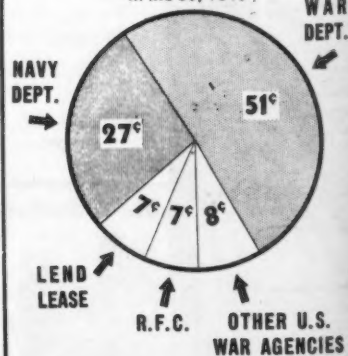
The new termination date of Maximum Price Regulation 174 is contained in Amendment No. 3 to that measure, effective June 29.

The ceilings established by the regulation, cover the sales of freight car materials interchanged between car builders and railroads and would have terminated June 30.

WAR DOLLAR

breakdown of appropriations
by agency

APRIL 30, 1943

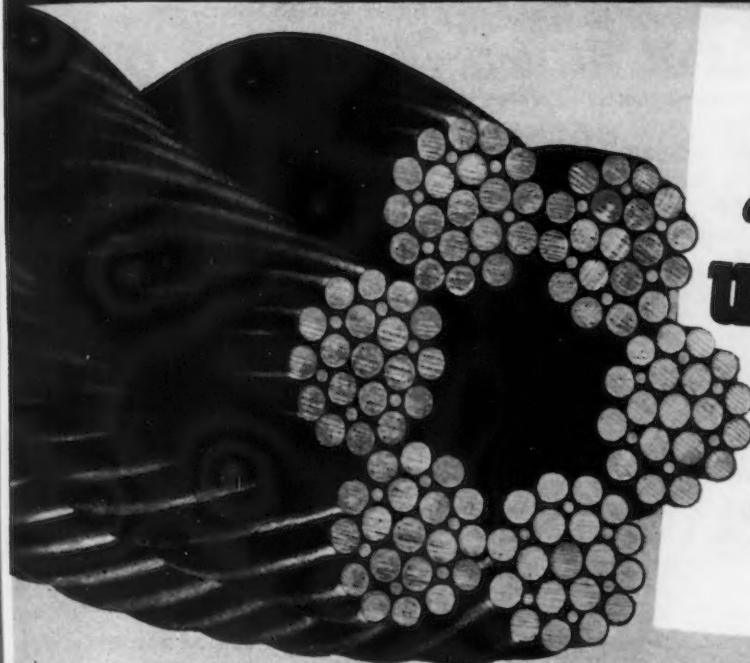


DATA: WPB

**BECAUSE THEY DON'T FIGHT
EACH OTHER LIKE THIS →**



*Every Wire —
Every Strand of*
union-formed
Wire Rope
**PULLS TOGETHER
TO WEAR LONGER!**



These two kinds of wire rope are made in our factory of the same special analysis high carbon steel, the same carefully controlled heat treatment and continuous wire drawing process. As made by our skilled craftsmen both give you plus value.

Yet there is a difference which means money-in-your-pocket. It is this: In ordinary wire rope of any make, the wires are "laid" into position without first being relieved of stresses set up through changing wires from straight to helical or spiraling shapes. Under these unresolved stresses, the wires have a strong tendency to fight each other and will fly apart when the seizing wire is removed. This wasted effort cuts down the resistance to bending fatigue of the rope as a whole.

In *Union-formed* wire rope, the method of helical or spiral shaping the wires in it before they become component parts, entirely frees the rope of shaping stresses. Thus preformed, parts lay in their positions in such perfect repose that they will not fly apart—in fact, often must be pried from position. *Union-formed* wire rope, therefore, utilizes its full stamina for maximum

resistance to bending fatigue. That is why *Union-formed* wire rope bends more easily. Every wire and every strand pulls together to wear longer.

This is only one of 10 time-saving, money-in-your-pocket advantages of *Union-formed* wire rope. To the limit permitted under conditions of war, Union is striving to satisfy urgent needs outside of war production.

UNION WIRE ROPE CORPORATION
2158 Manchester Ave., KANSAS CITY, MO.

Tulsa • Houston • Chicago • Salt Lake City • New Orleans
Monahans, Texas • Portland • Ashland, Ky. • Atlanta

USERS OF HIGH CARBON STEEL WIRE NOTE!

Subject to war conditions only, our facilities are such as to afford you a dependable source of supply for high carbon steel wire. Our engineers are prepared to submit interesting proposals on your specifications and requirements.

AG-43

Each ★ Represents Another 6 Months
of Star Performance



**WAR PRODUCTION
EXCELLENCE WILL BRING
POST WAR PLUS VALUES**



"THE ULTIMATE IN LOW COST WIRE ROPE"

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**

Hold it, MISTER!



**...there's an easier
way to end your
motor problems
ask Westinghouse!**

Simplify your problem at the start—draft Westinghouse "know-how". With 57 years of Westinghouse motor and control experience at your elbow, you'll find the *one best motor for the job* sooner—with certainty . . . whether it means new design, modification or selection of an existing type. For engineering aid...call or write your nearest Westinghouse office. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

J-21289

Proof?
see page 2*



NEWS OF INDUSTRY

Warehouses Permitted Some Products Without Authorization; Farmers Aided

Washington

• • • Instructions have been sent to producers by the steel division as follows:

(1) A producer may in any month within the limits of his production directive for the particular product group hereafter listed, make delivery of these products to warehouses on orders which are not authorized controlled material orders after he has filled all authorized controlled material orders for the same product group calling for delivery in the same month. The products included in the above group include:

- (a) Galvanized or painted formed roofing and siding.
- (b) Wire bale ties.
- (c) Wire (barbed and twisted), wire fence (woven or welded), and netting.
- (d) Fence posts and gates.

(2) It has been brought to the attention of the Steel Division that orders accepted by producers on the above basis are not, in all cases, being listed on the "Daily Order Report" (CMP-26) submitted to WPB. As the tabulations made by WPB from the "Daily Order Report" are intended to show the order loads on the mills by months for all controlled steel products, it is evident that this order load will not include all tonnage placed with producers on the above basis and accordingly is incorrect to that extent.

(3) Effective immediately, all orders received by steel producers for the above listed products in accordance with the above reference should be included on the "Daily Order Report" and given the symbol "WH" and the tonnage distributed $\frac{1}{3}$ to each of the first three months following the month in which the order is accepted. This instruction is retroactive and you should now include on your next "Daily Order Report" or shortly there-

after, the orders accepted by you in accordance with the above reference, which have not been previously reported by you either on the "Special Accumulative Order Report" or on "Daily Order Reports." This procedure will also govern in reporting daily on Form CMP-26 all current and future similar orders.

Warehouses Hit On Trucked Steel

• • • OPA has ruled that on truck delivery of warehouse steel to a customer, the excess over the less-than-carload freight rate must be absorbed by the warehouse. This ruling was published as Digest No. 63 to Price Schedule No. 49. The ruling states:

"Where the truck rate is higher than the less-than-carload rail rate and a customer insists upon shipment by truck, the warehouse may not add to the maximum price the difference between the rail and the truck rate.

"Where less-than-carload shipments must now be handled at the higher rate for railroad pick-up and delivery service, the additional cost of delivery must be absorbed by the warehouse out of its margin."

Deliveries Eased On Construction Machinery

Washington

• • • Restrictions on deliveries of certain items of construction machinery for civilian use have been eased by WPB. By making changes in Schedules A, B and C of Order L-192, post hole diggers, hand-carried concrete surfacing machines and "finishers and rodding machines for wet concrete" were made available for civilian as well as military use.

A number of other minor changes were made in the description of items in the schedules for the purpose of clarification.

Styles of Steel Fence Posts Cut from 75 to Less Than 20

• • • The number of styles of steel fence posts have been reduced by WPB from approximately 75 to less than 20. The resulting saving in steel is estimated at about 6000 tons.

The weights of the posts provided for in Schedule No. 14 issued July 6 to Limitation Order L-211, are standard, are adequate for farm use, and have been approved by the Department of Agriculture.

WAR PROGRAM - IN BILLIONS 1940-1943

1940 (LAST 6 MONTHS)
\$3,000,000,000

1941
\$16,500,000,000

1942
\$59,000,000,000

1943
\$106,000,000,000 (GOAL)



SuVeneer

CLAD METAL

Trademark Reg. U. S. Pat. Off.

Serving invaluable in war—ready to meet many new product applications in post-Victory years!

A VITAL war-time application of SuVeneer Clad Metal: bullet jackets of gilding-metal covered *steel*, instead of the solid gilding metal jackets formerly used—*saving thousands of tons of copper every month*. In its performance on this critical assignment, SuVeneer Clad Metal displays the unique characteristics that suggest wide possibilities for your post-war product planning. We will be glad to extend further information upon request.

HERE'S A CASE IN POINT:

Are you considering SILVER in Bearings?

We do not make bearings—but our SuVeneer Silver Clad Metal is now being tested by bearing manufacturers. Silver inseparably bonded to steel is one of the many different products now being developed by the exclusive Superior process. Composite SuVeneer metal is produced in strip form, with controlled thicknesses of clad metal on one or both sides. The SuVeneer strip may be stamped, spun, formed or shaped by customary methods.



Superior Steel

CORPORATION CARNEGIE, PENNSYLVANIA.

METAL SPECIALTY

*fulfilling exacting
requirements*

for

INDUSTRY

in

PLASTIC MOLDING

and

METAL WORKING

Drawing - Coining
Rolling - Forming
Stamping - Welding

Metal Specialty's plants are equipped to render you complete service in the fabrication of all Metal Parts, and in Plastic Injection Molding up through 18 ounces per shot. Along with 850-ton self-contained hydraulic presses for Metal Working, Metal Specialty has one of the four 18-36 ounce capacity injection presses for Custom Molding together with full complementary equipment.

Assembled Jobs - Pressed Metal to Order



The
METAL SPECIALTY Co.

MAIN OFFICE AND PLANT • ESTE AVENUE • CINCINNATI, OHIO



Details of CMP Reg. No. 6 Simplified; Closely Follow Pattern of Reg. No. 1

Washington

••• Issuance of CMP Regulation No. 6, announced by the WPB last week, brings materials for construction and facilities under CMP. Controls over construction materials are similar to those exercised over production materials under CMP Regulation No. 1. However, use of materials for construction is related to authorized construction, rather than to authorized production schedules, as in the case of production materials.

For purposes of the regulation, construction includes reconstruction, restoration, or remodeling of any structure or project or any extension or alterations of such project. Facilities are machinery or equipment acquired in connection with construction.

The basic allotment procedure for construction is similar to the procedure in the case of production materials. However, in instances where regional WPB offices authorize small projects, purchase authority may be granted for any period necessary, rather than for a full quarter.

The controlled materials are steel, copper, and aluminum in specified forms and shapes.

Prime consumers who receive allotments of controlled materials for construction may use as much of their allotments as they need to obtain materials for construction, and must allot the rest to their secondary consumers.

Claimant agencies will be able to make advance allotments to prime consumers within specified limits.

Prime consumers are persons who receive allotments of controlled materials from a Claimant Agency. In most cases the prime consumer is the person who is to own the structure or project, and not the general contractor. Exceptions are as follows:

1. Where the structure is to be owned by the Army or Navy, the person who contracts with the Army and Navy for the construction is the prime consumer.
2. If the project is a foreign project, the person holding the export license for the materials required for the construction is the prime consumer.
3. In the case of projects financed by Defense Plants Corp., the prime consumer is the person designated as such by DPC.

Manufacturers producing Class A products off the site of construction, may obtain their materials through the allotment procedures under CMP Regulation No. 6, but their use of allotments is governed by CMP Regulation No. 1. Controlled Materials for the manufacturers of Class B products are not obtained under CMP Reg. No. 6.

Applications for allotments of controlled materials are filed by prime consumers on various forms, which in most cases are the same as those required to obtain authorization to begin construction under the terms of L-41. The various forms of application are listed in Exhibit A attached to the Regulation. Most important among these forms is WPB-617, formerly PD-200. Under no circumstances will persons seeking materials and authorization to construct be permitted to file Form PD-200, which WPB-617 replaces, after July 1 for these purposes. In addition, a request for an amendment to an approved application, whether filed originally on PD-200 or WPB-617, must be submitted on the new Form WPB-1548 which supersedes PD-200B.

Consumers of controlled materials in construction may require their suppliers to furnish them with applications for allotments on Form CMP-4A, covering the requirements for the products or parts to be supplied. However, this application may be waived in cases where the consumer who is required to make an allotment has adequate information on which to base his own application for controlled materials. In no case may a consumer

HELP!

We Need War Work Sub-Contracts For Wood Work

If you're using wood products in your War work, we can help you—and you can help us. Centrally located in Cincinnati, we have one of the largest wood working plants in the country. *And we have ample supplies of lumber.* Our facilities for mass production of wood products are complete. We are equipped to do drying, machining, boring, assembling and finishing.

We want to keep our men and machines busy with large volume weekly or monthly repeating orders from firms with preference ratings. We would like to quote you. Our normal peacetime volume is one of the industry's largest, so our skilled manpower and our physical properties are adequate to handle any assignment.

Write, wire or 'phone for complete information.

**NORWOOD
Manufacturing
COMPANY**

Fabricators of Wood Products

**NORWOOD
(Cincinnati 12) Ohio**



"SMITH HAS BEEN WORKING PRETTY HARD LATELY. PERHAPS AN AFTERNOON OFF MIGHT DO HIM GOOD."

THOMAS FLEXIBLE COUPLINGS

Last a Lifetime Without Maintenance

1

NO WEARING PARTS

2

**NO
BACKLASH**

3

NO LUBRICATION



High quality in flexible couplings is as important to you as good construction in prime movers and connected machines. Built to suit any standard as well as special applications, Thomas Flexible Couplings protect the very vitals of large or small equipment. Not only will the couplings last a lifetime without maintenance, but they will add years of life and permit continuous production from your costly engines, motors, and turbines, as well as the expensive machines they drive. It will be well worth your while to send for a catalog today.



THOMAS FLEXIBLE COUPLING CO.

W A R R E N • P E N N A .

include requirements for Class B products in applications for controlled materials needed for construction. Producers of Class B products, whether they are to be used for construction or production purposes, will obtain requirements of controlled materials by making application to WPB.

In cases where maintenance or repair work is being performed on a structure or project as part of a construction job for which authorization to begin construction is required under L-41, controlled materials for the maintenance or repair must be included in the prime consumers' application. This results from the fact that under L-41 no project may be part construction and part maintenance or repair. Controlled materials or other materials or products needed for maintenance or repair of this type may not be obtained under CMP Regulations No. 5 or No. 5A, if the cost is in excess of the limits established under Order L-41, unless specific authorization has been granted.

However, if maintenance or repair work or a minor capital addition is of a character which does not require specific authorization under Order L-41, necessary materials may be obtained under CMP Regulations No. 5 or No. 5A within the limits indicated.

Consumers may make allotments of controlled materials on WPB forms prescribed for that purpose. Suppliers must make allotments of controlled materials in the forms and shapes which have been allotted to them—and only in those forms.

The Regulation includes an alternative form of allotment under which a prime consumer may make simultaneous direct allotments to all secondary consumers in the production chain, regardless of their remoteness from the prime consumer.

Consumers may combine in a single allotment to a supplier the controlled materials requirements for several construction jobs which are identified by the same major program number of a particular allotment may not be used to obtain materials for any construction project which has not been approved on an authorization to begin construction.

Exemption from the usual allotment procedure is granted in the case of a delivery order or Class A products on contracts or subcontracts which require less than 1 ton of carbon steel or wrought iron, 400 lb. of alloy steel, 100 lb. of copper and copper base alloy, or 20 lb. of aluminum. In these cases an order may be placed bearing the applicable allotment number followed by the symbol SO.

Speeds Material Handling ...for Victory!

RE-POWER with READY-POWER

Gas-Electric Power Plant for Electric Truck Operation

R-P power for electric truck operation, handles materials at lowest cost per ton.



Baker Fork Truck



Yale Crane Truck



Hi-Lift Truck

Continuous Power

INDUSTRY TODAY needs Ready-Power more than ever before to handle materials faster, more economically, and to speed up production to the wartime pitch. Ready-Power equipped trucks handle more loads per hour, per day, per year, than the same equipment battery powered. Ready-Power (Gas-Electric) Units convert ordinary trucks into trucks with higher peak performance because of the continuous flow of power.

Peak Performance

The Ready-Power Company does not make industrial trucks but supplies the gas-electric power plants that make electric trucks do more work. Truck manufacturers furnish Ready-Power equipment on new trucks at your request—or you can get Ready-Power units to replace batteries now in operation, direct from The Ready-Power Company.



Elwell-Parker Truck
Steel Handling

Since 1924, thousands of R-P Units have been adopted by Industry to their toughest jobs.

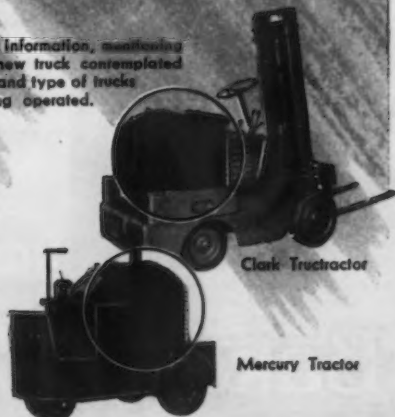
R-P replaces storage batteries and charging equipment—makes the electric truck completely mobile—free from limitations imposed by use of batteries for truck power.

R-P power plants are good for the life of the truck—handle the loads quickly.



Automatic Platform Truck

Write for information, mentioning type of new truck contemplated or make and type of trucks now being operated.



Clark Tractor

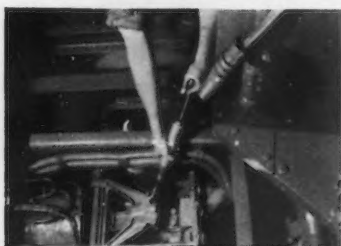
Mercury Tractor

THE READY-POWER CO.

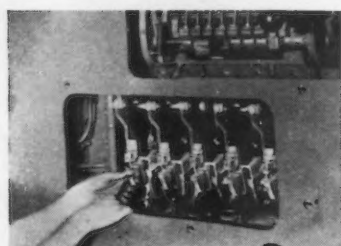
3841 Grand River Avenue • Detroit Michigan, U. S. A.

How to Keep Your Trucks Running FOR THE DURATION

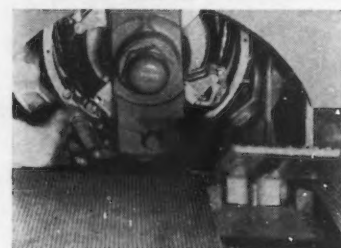
● Proper maintenance of industrial trucks always pays dividends, but today it becomes a deciding factor in the success of our war production effort. Most truck failures can be avoided by routine care and maintenance.



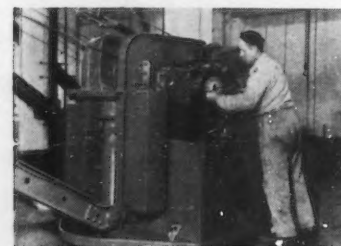
Correct lubrication according to manufacturer's instructions is an essential phase of truck care.



Control equipment should be inspected monthly. Here mechanic is replacing a finger tip.



Dust covers should be removed monthly to inspect commutators and brushes... Brushes should have at least 60% bearing surface.



Removing the rotor disc from the magnetic disc brake for monthly inspection.

First—Provide good floor conditions and DO NOT overload.

Second—Place trucks under the supervision of a competent mechanic.

Third—Lubricate regularly as instructed by manufacturer.

Fourth—Keep a record sheet covering weekly inspection findings, lubrications, adjustments, repairs. Thus excessive wear can be spotted and serious damage overcome.

ROUTINE SCHEDULE FOR TRUCK MAINTENANCE

Every Week. BRAKES—Test service brakes for stopping with maximum load, and parking brakes for holding on steepest incline. Adjust as required. Inspect linings—if dirty or greasy, wash in gasoline, if worn, replace.

STEERING CONNECTIONS—Test for:

- Lost motion at ball joints and rod yokes due to wear.
- Tight joints at rod yokes due to bent levers or rods.
- Misalignment of steering wheels.
- Worn bearings in steering post or bell crank.

Make adjustments according to instructions, and replacements as required. **WHEEL ALIGNMENT**—Follow manufacturer's instructions for checking and lining up wheels on each type of truck. **LIFT OR HOIST**—Clean grease and dirt from rails, inspect chains, anchor bolts, hydraulic system, and limit switch. Use neatsfoot oil to keep leathers soft. **LUBRICATION**—Follow manufacturer's instructions for points requiring weekly lubrication. **ELECTRICAL EQUIPMENT**—If working in dusty environment, remove covers from motors and electric controls, and blow out dust.

Every Month—Monthly inspection covers the most important mechanical parts of truck: power axle, wheel bearings and universal joints, spindle bearings, drive and torque yokes, Oldham coupling, trailing axle and wheels, brake drum, motors, brushes, controller, contactor, limit switches, hydraulic lift. Repairs on these parts are costly. Do not slight any part that requires lubrication. Keep moving parts free from dirt and grease. Follow detailed instructions from manufacturer.

Maintenance check list is available in bulletin form. Write for your copy or copies today.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company

2175 WEST 25th STREET • CLEVELAND, OHIO

In Canada: Railway and Power Engineering Corp., Ltd.
2900-2A-43

Baker INDUSTRIAL TRUCKS

NEWS OF INDUSTRY

States Granted SRC Steel for Auto Plates

Washington

• • • Under Order L-32-a, states are permitted to use metal on hand, or sheet and strip steel not heavier than 22 gage and listed as idle or excess inventory with the Steel Recovery Corp., for the purpose of manufacturing one 1944 license plate per motor vehicle. Specific authorization of WPB must be obtained to purchase the steel listed with the corporation.

Limiting the license plates to one per car and to the maximum size of the 1942 plates issued by the respective states will effect a saving of 12,500 tons of steel. Pre-war annual requirements were about 20,000 tons.

The move to conserve steel used in license plates was initiated by Order L-32, issued March, 1942, which permitted only the manufacture of small date tabs and replacements for lost or damaged plates. At the time, the plan was to change the date tabs with each succeeding year. It was pointed out that 1500 tons of steel frozen in state owned stocks and 6000 tons of steel listed with the Steel Recovery Corp. are being made available for license plates if every effort to find a substitute has failed.

It was made clear that the steel shortage is as acute as ever and efforts to obtain scrap metal and other critical material must not be relaxed.

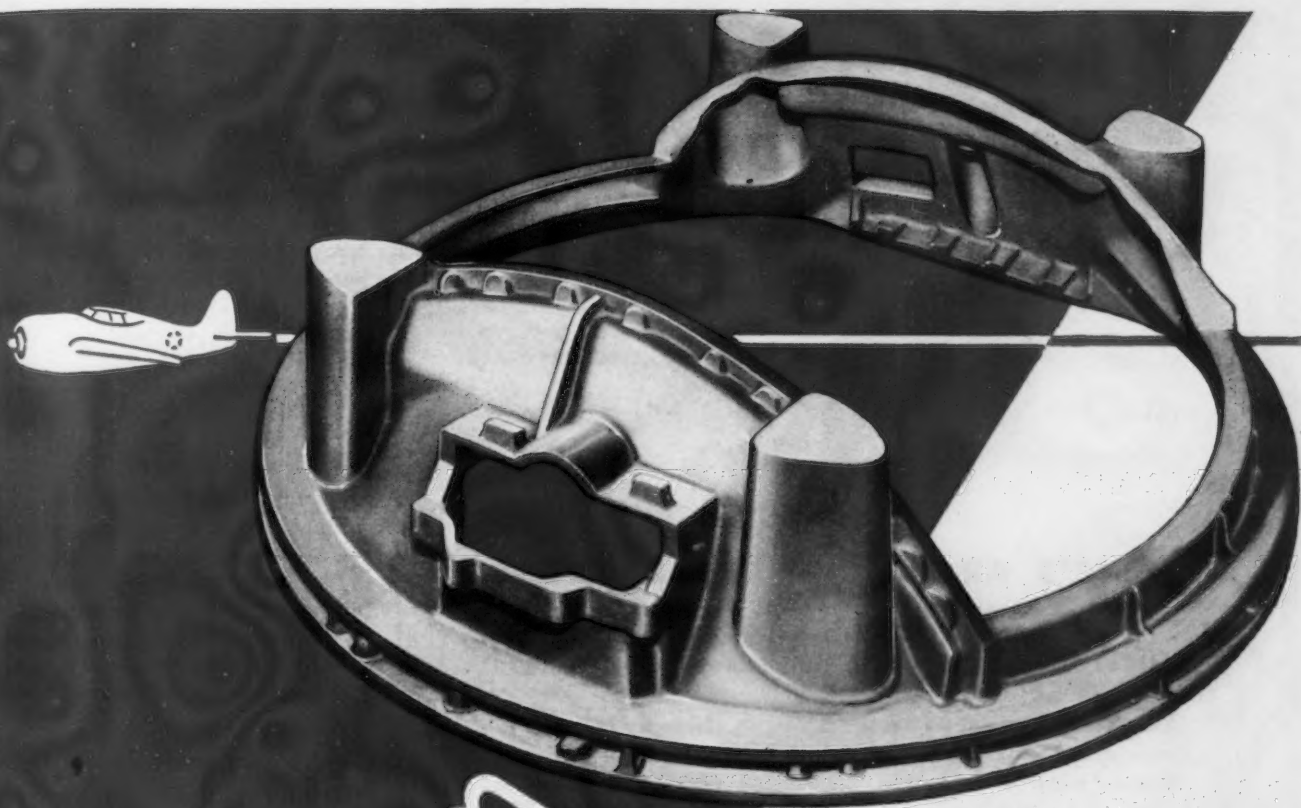
Procedure Clarified For Marine Fittings

Washington

• • • Marine fitting hardware when a part of wire rope assemblies may be purchased without making application on Form PD867, the WPB said in a statement clarifying the scheduling of marine fittings as defined in General Scheduling Order M-293.

Prospective purchasers of loose fittings, which are manufactured by wire rope manufacturers but are not part of rope assemblies, must make application for approval of purchase orders on this form under the provisions of M-293.

Wire rope manufacturers, however, are required to apply for authorization (Form PD-867) to purchase marine fittings, whether these fittings will be used in assemblies or for distribution to retail outlets and consumers as loose fittings.



**ALUMINUM
CASTINGS**

Giant Aluminum Castings for War Machines

"It can't be done" is never the answer when cast parts, hitherto considered impossible, are brought to Howard Foundry.

Our aluminum division is producing aircraft castings up to seven feet in diameter. Too, we have made aluminum castings up to twelve feet long for other armaments—part of our current output of aluminum cast parts for tanks, ships, planes, and ordnance.

At our magnesium and bronze plants, castings for the war effort constitute our entire production. Together, these three great foundries are pouring an unheard of tonnage to shorten the war.

For armament today—for utility tomorrow.

HOWARD FOUNDRY COMPANY ®
4900 Bloomingdale Road Chicago



*Awarded and reawarded
for proficiency in the
production of ordnance
materiel.*

HOWARD
ALUMINUM · BRASS · BRONZE · MAGNESIUM



CASTINGS



WHAT'S AROUND THE CORNER?

This question never was an easy one to answer. And a Global War doesn't make the answers any easier to find.

Yet, to many executives, as far as their own businesses are concerned, it is not unanswerable.

Some, with completely converted plants are now planning to get back into their former fields. They are redesigning their old products . . . utilizing new processes, new methods and new materials. They are laying plans for revamping their facilities to the postwar job.

Others have discovered new product opportunities in their war production setups. They plan to utilize the "know-how" which they have developed during the war.

Still others are making equipment surveys. They know that changes made for war production will affect their carefully planned peacetime equipment balance and influence a decision as to the volume of prewar products to be included in postwar production plans.

In such studies, management has often discovered the real value of the outside viewpoint. Our organization, because of its background of broad and unusual experience, has been helpful. May we discuss postwar planning with you?

Geo. P. Trundle Jr.
President

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

GENERAL OFFICES • CLEVELAND • BULKLEY BLDG.
CHICAGO • City National Bank Bldg. • 208 S. La Salle Street
NEW YORK • Graybar Building • 420 Lexington Avenue

Deputy Chief Named To WPB Facilities Bureau

Washington

• • • The appointment of Roy W. Johnson of Stamford, Conn., as deputy director of the Facilities Bureau of WPB was announced July 7 by Vice-Chairman Donald D. Davis.

Mr. Johnson succeeds Col. Gordon E. Textor, who has returned to duty with the U. S. Corps of Engineers.

ODT Appointment

• • • Joseph B. Eastman, Director of ODT, last week announced the appointment of Richard O. Fischer of Chicago, as deputy director of ODT's Division of Railway Transport. Mr. Eastman said that for the time being Mr. Fischer would perform special duties on the staff of V. V. Boatner.

Cast Iron Needs Totaled For Industrial Use in 1943

• • • Industrial facilities will require a total of 904,800 short tons of cast iron for construction and machinery and equipment for 1943, it was estimated last week by WPB.

This estimate includes all new construction, major alterations, additions and facilities.

The total cast iron requirements for industrial facilities is divided into the following quarterly estimates. First quarter, 329,600; second quarter, 257,100; third quarter, 184,100; and final quarter, 134,000.

Of the total, 770,900 short tons will be required for machinery and equipment, while the remaining 133,900 short tons will be consumed in construction.



"It Says On The Card From Your Fellow Riveters!"



THIS IS THE WHEEL*MR. JONES

● Maybe you were stumped by grinding jobs before, but they won't worry you any more.

300 shapes and sizes—every grade and grain—there is a Chicago Mounted Wheel custom-built to take on *any* grinding problem. Each wheel is a whirling point of power that turns your jobs out smooth—and in a hurry.

PROMPT DELIVERY

Action is the keynote from the moment your order comes in. Our wartime set-up concentrates on mounted points and grinding wheels 3" in diameter and under.

—Production is stepped up and keeps pace with demand. Another advantage to you is our central location.

NEW CATALOG—Shows Chicago Mounted Wheels in actual colors, also portable electric tools and time-saving accessories.

CHICAGO WHEEL & MFG. COMPANY

America's Headquarters for Mounted Wheels and Small Grinding Wheels.

1101 W. Monroe St., Dept. RA
Chicago, Illinois

*Half a century of specialization has established our reputation as the small wheel people of the abrasive industry.

TEST WHEEL FREE—Tell us the job, type grinder and size wheel you use and we'll send one prepaid.

- ☐ Send Mounted Wheel Catalog
☐ Free Wheel. Size.....
☐ Also interested in Grinding Wheels

Name.....

Address.....

Shipyard Preference Ratings Deferred to Aug. 1

Washington

• • • The revocation of orders giving Maritime Commission shipyards preference ratings in buying materials for the construction of shipyards and other facilities has been deferred until Aug. 1, WPB announced last week. On June 25 WPB issued orders revoking, as of July 1, preference rating order P-14-a and P-14-b.

On the revocation of these orders, priority assistance will be applied for on form WPB 617, formerly PD-200. The effective date of the revocations has been extended to provide a longer period of adjustment to the changed method of obtaining materials.

Core-Binder Exempted

• • • Core-binder, a corn product used in the metal industries, was exempted by OPA on Saturday from price control.

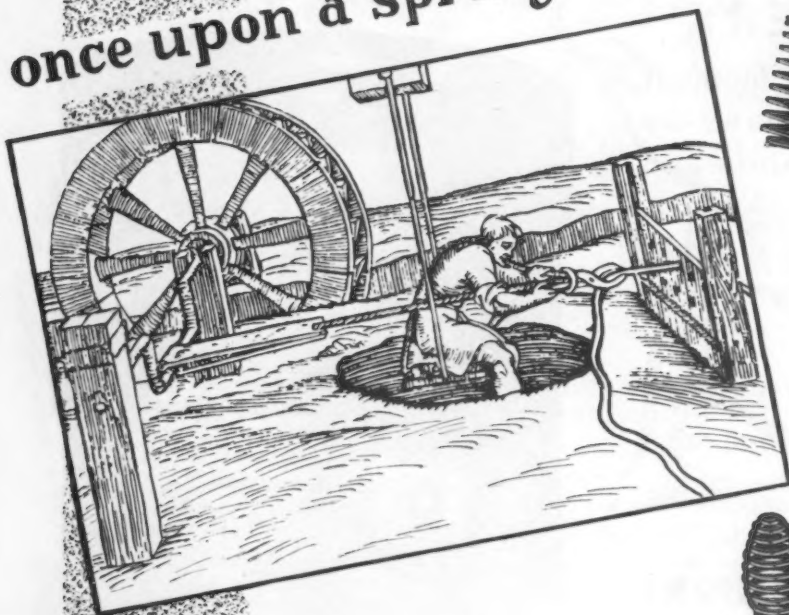
Westinghouse Unifies Activity In Industrial Electronics

• • • To expedite present wartime applications of electronic devices and to be able to utilize these developments for post-war uses, Westinghouse Electric & Mfg. Co. has established a group of electrical engineers who will guide and direct the industrial, central station and transportation electronic applications.

Two senior engineers, Gordon F. Jones and Carl J. Madsen will head the industry engineering group, while Amos J. Germain will be in charge of the industrial department activities. Gordon Jones will specialize and act as consultant on conversion problems, including power rectification and inversion in the central station, industrial and transportation fields. During his 24 years with Westinghouse he has held various positions, the most recent of which has been in central station engineering. Madsen will act as a consultant on application work in connection with the electronic methods in process and speed control, induction and dielectric heating, and will coordinate general educational work on electronics. Germain will direct the commercial relations of this electronic group.

In appraising the field of electronics before a group of trade paper editors last week, A. C. Monteith, manager of the industry engineering department, indicated that probably \$500,000,000 worth of business was done in the industrial field in the last three years, excluding radio and radar. A large part of the business has been the direct result of the war and this has given engineers an opportunity to try new ideas. Improved tubes have proved to be the key to major electronic advances and the outlook for improved tube characteristics appears encouraging.

once upon a spring-time...



A METHOD of wire manufacture, utilizing both man and water power, was a long step ahead of earlier all man-power methods.

Modern precision methods of wire making, supplanting these crude efforts, have also made possible Torrington Spring Coilers which operate on a principle equally advanced.

Torrington's method of spring coiling, as opposed to spring winding, has enabled professional springmakers to produce a great variety of springs with a minimum of special tooling, and to produce them with an unusual degree of uniformity and accuracy.

With the torsion spring attachment, or with one of several other recently developed attachments, many springs become practical which could not be made by any other means.

No. 2 of a Series

THE TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT



"He can't forget those week-ends at the beach."



All work—and no play!

A lot of modern products and plant equipment aren't performing up to design possibilities... because controls haven't kept pace with the mechanical developments. W·A·B Remote Control Systems take these hobbles off.

With W·A·B Controls, you can govern an almost limitless variety of multiple functions from one small, compact station. These systems work every time—all the time. They eliminate play, back-lash and overrun. They make connecting links, levers, bell-cranks and similar devices unnecessary.

W·A·B Control Systems respond to a touch instead of a tug, yet can exert a powerful operating force where required. A group of functions can be progressively handled by a series of movements, front to back, of a single control handle.

In engine controls, for instance, movement of the handle in the forward quadrant produces as fine and precise control as hand throttling, while the mere

movement of the handle through the neutral position can declutch, apply a shaft brake, reverse the gears or cam shaft, release the brake, and re-engage the clutch.

The basic operating principle provides graduated pressures that cushion equipment against shock, and prevents error by the operator in the speed or the order of sequence operations.

Whether you are concerned with production or with product improvement, it will pay you to check your control needs against the advantages that W·A·B Remote Control Systems offer. In many cases, problems have been completely solved with regular "off the shelf" W·A·B devices. Phone, wire or write.

Westinghouse Air Brake Company



INDUSTRIAL DIVISION

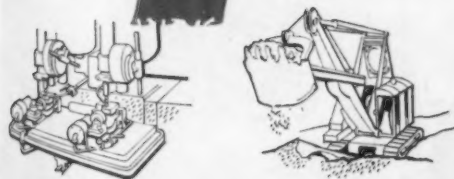
General Offices: Wilmerding, Pa.

74 Years of Pneumatic Control Experience

W·A·B

PNEUMATIC
PNEUMATIC-ELECTRIC
PNEUMATIC-HYDRAULIC

control systems



Briefly Told—

Fisher Body Given
Letter of Intent for
Dual Purpose Mounts

• Fisher Body Div., Detroit, has received letters of intent from the Navy covering materials and facilities to produce 5-in. dual purpose gun mounts. Assembly of the 40,000-lb. mounts will be done entirely by Fisher, with work distributed among four plants in the Michigan area and sub-

contracts totaling almost half of the dollar volume awarded to outside shops.

• A new foundry in Birdsboro, Pa., for the U. S. Navy has been completed by the Turner Construction Co. The foundry, especially

built for operation by the Birdsboro Steel Foundry & Machine Co., as lessee, has already started production of anchors, propellers, and heavy ship parts weighing up to tons, all cast by a process eliminating costly machining and finishing to size.

• Realizing the vital importance of the type of factory propaganda which give the workers a greater sense of participation in the war, the British Ministry of Supply, through its Public Relations Directorate in London, has for some time operated a scheme known as "Work Relations," designed to keep war workers informed of the part that they and their things, big or small, that they make, are playing in the conflict.

• War Production Drive Headquarters announced recently the extension of Labor-Management Productivity Committees to 2100 war plants, employing 4,556,150 workers, through the addition of 200 committees which have recently registered with Drive Headquarters.

• Shipments of usable iron ore from mines in the United States in May totaled 13,921,402 short tons, according to the Bureau of Mines, U. S. Department of the Interior. Of this total, 12,471,300 tons, or 90 per cent, was shipped from mines in the Lake Superior district. Production of usable ore totaled 13,111,000 tons; an increase of 133 per cent over April. Minnesota accounted for most of this increase, producing 10,006,976 short tons in May compared to 2,692,019 tons in April. Pyrite cinder and sinter production in May totaled 70,695 short tons, about one-third of which was shipped to steel-making furnaces. The first decrease in mine stocks since November, 1942, was recorded in May when stocks dropped 10 per cent. This drop was due to increased Lake movement of iron ore during the month.

• The giant C-46 troop transport plane, the largest twin-engine airplane type in the world, already in production in the western New York plants of the Airplane Div. of Curtiss-Wright Corp., will be built in quantity in another factory in Missouri, it was announced by G. H. Vaughan, president of the corporation. The giant Commando has a wingspan of 108 ft., weighs about 50,000 lb. fully loaded and is powered with two 2000 h.p. engines.

• The war will be prolonged and essential war production delayed, unless there is more

America's finest
complete service

to the Plating, Polishing
and Anodizing Plants



Part of Udylite's design and layout department where you may obtain the advice and assistance of experienced metal finishing engineers.

This is the laboratory where all Udylite products are developed and constantly tested under actual plant operating conditions.

UDYLITE has everything for the metal finishing plant. An Engineering Staff with years of practical experience to assist you in laying out your new plant or improving the efficiency of your present one.

Equipment for every need, that has proved its dependability in actual service records.

A very complete list of supplies second to none in quality. If you have a metal finishing requirement or a tough problem bring it to Udylite. Our experienced engineers and electrochemists are at your service. Your inquiry will be handled promptly and efficiently.

THE UDYLITE CORPORATION

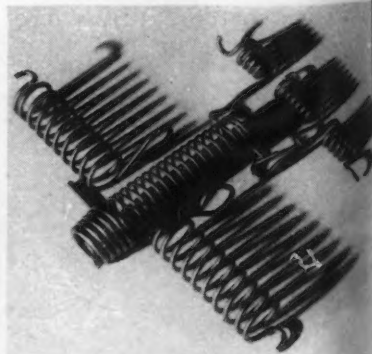
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Chicago
1943 Walnut Street

Long Island City, N. Y.
11-16, 44th Drive

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4408 Carnegie Ave.

"WARPLANE" OF SPRINGS
Springmakers at Barnes-Gibson Raymond Division of Associated Spring Corp., Detroit, combine photographic talents with imagination to produce this object.



STON, D. C. STEP ON IT YOU'RE HOLDING UP THE SHOOTIN' MATCH

*"You bet we'll step on it -
by speeding up cleaning with
ELECTRO PORTABLE GRINDING WHEELS"*

The high metal removal rate of Electro Resin Bonded Portable Wheels is speeding up war work for many ferrous and non-ferrous foundries, steel mills and welding shops.

Recent technical advancements in this type of wheel, providing faster cutting, greater toughness and durability, can step up cleaning for your plant, too.

By concentrating 100% on resin bonded wheels, the engineering and production facilities of Electro's Grinding Wheel Division assure you faster and more efficient service. Wheels of standard and special shapes are readily available in diameters from 1" to 42" inclusive.

- ✓ **FASTER CUTTING**
for more production
- ✓ **TOUGHER**
for greater safety
- ✓ **MORE DURABLE**
for lower cost

ELECTRO REFRACTORIES AND ALLOYS CORP.

GENERAL OFFICES: ANDREWS BUILDING, BUFFALO, N. Y.

Manufacturers of Crucibles, Alloys, Stoppers, Refractories, Grinding Wheels

available in the next six months 2,000,000 tons of steel (100,000 tons for Wisconsin industry), was the message brought by Charles Halcomb, Washington, to several hundred state industrialists who attended a meeting of the WPB Steel Division in Milwaukee.

• "Electronics at Work," an educational motion picture released by Westinghouse, explains the six basic functions of electronic tubes and shows how each type of tube is used in some of the latest industrial and military applications. Animated drawings showing tube construction are used to explain how the cathode, anode and grid elements rectify, amplify, generate, control, transform light into electric current and transform electric current into light. The 20-min., 16-mm. sound

films will be loaned free for showing at war plants and technical societies.

• Midwest metal casket makers are reported unusually active—making wooden caskets. They complain, however, that a lack of help is restricting output.

• Are you interested in details of the "Truck, Amphibian, 2½-Ton, 6 x 6, DUKW-353," nicknamed the "Duck"? It has an overall length of approximately 31 ft., a width, or beam, of approximately 8 ft. and is approximately 7 ft. high when its canvas top is down. It has a

wheel base of 164 in. and a dry shipping weight of 14,100 lb. Its 6 x 6 designation indicates that it has six wheels, all with driving power. On land, the amphibian truck can carry approximately 35 men. On water, it can carry 50 or more, depending on the freeboard required to negotiate a particular water crossing.

• New England war plants have had \$9,786,668,000 worth of war contracts, or 10.3 per cent of the nation's total. It has received less than 5 per cent of the country's new plant facilities. Connecticut topped the list with \$4,785,949,000 in contracts with Massachusetts second with \$3,568,565,000. Maine was third with \$741,055,000; then Rhode Island with \$460,989,000; New Hampshire with \$161,336,000; and lastly Vermont with \$68,774,000.

• Mack Trucks, Inc., has been producing high-precision high-strain parts for the new Republic Thunderbolt, P-47, during the past year, according to company executives. This announcement revealed the important subcontract work being performed by Mack in addition to its many prime contracts.

• Milwaukee has less absenteeism and a considerably lower rate of industrial acci-

and now —

LIFTING MAGNETS

by

Stearns
MAGNETIC



The House of Stearns Magnetic now is in position to supply a full line of LIFTING MAGNETS. Our many years of research and development in magnetic engineering is your assurance that Stearns Lifting Magnets embody the latest ideas in design and construction . . . your guarantee of powerful, tough, hard-working, low cost magnets with minimum maintenance expense. It will pay to investigate Stearns Lifting Magnets.

Our Bulletin 35 will give
you the data. Write for it!

Stearns
MAGNETIC MFG. CO.
635 S. 28th St.

SEPARATORS DRUMS ROLLS
CLUTCHES BRAKES
SPECIAL MAGNETS

Milwaukee 4, Wis.

HANDICAPPED WORKER DOES HER SHARE: Shown sorting rivets which have to be heat-treated and frozen before they can be used in warplane production is Mrs. Evelyn Moore, physically-handicapped aircraft worker in Columbus, Ohio plant of Curtiss-Wright Corp. She is one of many handicapped workers placed in charge of the Columbus plant's new "rivet control" program.



Infinite



Care

The quality of Arcos Weld Metal has its origin in the rigid Arcos material specifications and in our production control laboratory. There, the chemical and metallurgical characteristics of Arcos electrodes are thoroughly checked during all stages of production. A separate unit, the Arcos Research Laboratory is reaching out into experimental fields to improve and develop the alloy electrodes which will continue to maintain the traditional Arcos leadership.



Distributors Warehouse Stocks in the Following Cities:

Borger, Texas.....Hart Industrial Supply Co.	Kingsport, Tenn.....Slip-Not Belting Corp.
Boston, Mass. (Belmont), H. Boker & Co., Inc.,	Los Angeles, Calif.....Victor Equipment Co.
W. E. Fluke	Milwaukee, Wis.....Machinery & Welder Corp.
Buffalo, N.Y.....Root, Neal & Co.	Moline, Ill.....Machinery & Welder Corp.
Chicago, Ill.....Machinery & Welder Corp.	New Orleans, La.....Wm. D. Seymour Co.
Cincinnati, Ohio.....Williams & Co., Inc.	New York, N. Y.....H. Boker & Co., Inc.
Cleveland, Ohio.....Williams & Co., Inc.	Oklahoma City, Okla..Hart Industrial Supply Co.
Columbus, Ohio.....Williams & Co., Inc.	Pampa, Texas.....Hart Industrial Supply Co.
Detroit, Michigan.....C. E. Phillips & Co., Inc.	Pittsburgh, Pa.....Williams & Co., Inc.
Erie, Penna.....Boyd Welding Co.	Rochester, N. Y.....Welding Supply Co.
Fresno, Calif.....Victor Equipment Co.	San Diego, Calif.....Victor Equipment Co.
Fl. Wayne, Ind..Wayne Welding Sup. Co., Inc.	San Francisco, Calif.....Victor Equipment Co.
Honolulu, Hawaii..Hawaiian Gas Products, Ltd.	Seattle, Wash.....Victor Equipment Co.
Houston, Texas..Champion Rivet Co. of Texas	St. Louis, Mo.....Machinery & Welder Corp.
Kansas City, Mo..Welders Supply & Repair Co.	Syracuse, N. Y.....Welding Supply Co.
	Wichita, Kansas.....Watkins, Inc.



"QUALITY WELD METAL
EASILY DEPOSITED"

dents than the average for the country, according to figures presented by Charles W. Pendock, chairman of the Association of Commerce war service commission, before the annual meeting of the Wisconsin Safety council at Milwaukee.

- Conservation of conservation-drive energy has been requested by the Cleveland regional WPB, which has asked that neighborhood scrap drives be postponed until backed by publicity and coordinated with city or nationwide drives. At present, neighborhoods are invited to concentrate on

drives for waste fats, tin cans, heavy melting steel, and old hosiery.

- Domestic bookings of electric industrial trucks and tractors during the month of April totalled 273 units, figures just released by the Industrial Truck Statistical Association, Chicago, indicate.

- Development of a compound made from Ameripol, the synthetic rubber, which will remain very flexible at -70 deg. F., has been announced by the B. F. Goodrich Co. The new compound is being used in

the construction of bolted tanks for storage of the high octane gas and aromatic fuels used in military aircraft.

- Among the thousands of items in the 35 warehouses bulging with WPA construction supplies that government liquidators would like to get rid of are 1146 portable drinking fountains. Other odd items include 500 sewing machines, 60 electric flat irons and a number of ironing boards; a \$2000 photostating machine and 1700 deluxe rubber-tired wheel barrows, 56 of which were never used.

- "Effect of Cold Drawing on Mechanical Properties of Welded Steel Tubing," by Winston E. Black, is the subject of Bulletin No. 341, issued by the Engineering Experiment Station, University of Illinois, Urbana, Ill. Experimental results of tension, compression, and hardness tests of samples of SAE 1010 steel tubing are presented.

- "This Too Is Sabotage," a 25 min. sound film dramatizing the importance of well-balanced meals to America's health, has been produced by the Westinghouse Electric & Mfg. Co., Pittsburgh, as an aid in the nationwide fight against industrial absenteeism, and as a contribution to the national nutrition program.

- A contract for construction of a high-pressure wind tunnel has been awarded to the Pittsburgh-Des Moines Steel Co., Pittsburgh, by the National Advisory Committee for Aeronautics. It will be built on the grounds of Ames Aeronautical Laboratory which adjoins the Naval air station at Moffett Field, Cal. Estimated cost is \$2,000,000.

- Norge Division of Borg-Warner Corp. is now producing main rotor transmissions with power take-off for Sikorsky helicopters. The rotor transmission drives the torque compensating rotor.

- In response to widespread request for assistance on safety methods in production, and absenteeism, the division of labor standards, U. S. Department of Labor has published the following three booklets: "Safety Speeds Production," "A Guide to the Prevention of Weight-Lifting Injuries," and "Controlling Absenteeism."

- At a recent meeting of the fractional horsepower motor industry advisory committee with WPB officials in Washington, the problem of motor servicing of essential appliances was discussed. It was recommended that adequate revolving stocks of standard motors be maintained throughout the country for exchange replacements. From three to five thousand standard motors are needed to replenish existing stocks and to insure prompt replacement service.

- The United States Steel Supply Co. has purchased the physical assets of Moise Steel Co., Milwaukee, according to E. E. Aldous, president of the Supply company. The Supply company will continue the steel warehouse business conducted formerly by Moise in Milwaukee. Carl Gallauer, formerly vice-president of Moise, has been appointed district manager and J. R. Beers, formerly manager of the Milwaukee sales office, United States Steel Supply Co., has been appointed assistant district manager.

STRONG CAST



BETTER STEEL CASTINGS DEMAND BETTER STEEL MAKING

The high regard Strong Steel castings have won in so many industries reflects Strong's skill as steel makers as well as steel casters. The melt being poured above comes from a 25 ton, acid bottom, oil fired, open hearth furnace of special Strong design. It will pay you to know Strong steels well—write or wire for the facts.

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N. Y.

STRONG



TENSILE STRENGTH • ELONGATION

Before

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THREE 3-POLE
CIRCUITS AND
OBSOLETE OPEN
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SWITCH

TWELVE 3-POLE
CIRCUITS AND
PROVISION FOR
TEN ADDITIONAL
... SAME BOX,
SAME CONDUIT

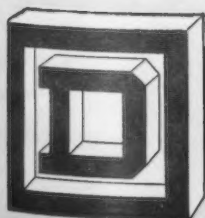
Here is the easy, economical way to provide for increased power demands

● Increased production has brought the demand for more power distribution in scores of plants. There are countless fusible panels similar to the one shown at the left above—inadequate and subject to excessive heating.

Notice how easy it is to convert to a compact, dead front circuit breaker panel.

Notice, too, that by utilizing thin wall wire, additional circuits have been provided, using existing box and conduit.

Your nearest Square D Field Engineer will be glad to work with you in determining your exact requirements for speedy, economical conversion.



ELECTRICAL EQUIPMENT

KOLLSMAN AIRCRAFT INSTRUMENTS

SQUARE D COMPANY

DETROIT

MILWAUKEE

LOS ANGELES

Nelson Lists Vast Production of Arms By U. S. and Canada

Toronto

• • • Gigantic battles in which "unheard of quantities of war material will be consumed" are coming soon, Chairman Donald M. Nelson said here July 4.

"This year, in this continent alone, we will produce almost twice as much

in combat munitions as the Axis," he said, giving these figures on accomplishment by the United States and Canada alone:

Almost 115,000 planes have been produced and "before the end of this year we will be producing a completed plane every four and two-thirds minutes."

More than 175,000 larger-caliber guns for ground armies alone have been finished and more than 1,500,000 machine guns and 6,000,000 rifles and submarine guns have been manufactured.

More than 200,000,000 rounds of artillery ammunition (not counting naval) have been made.

About 25,000,000,000 rounds of small arms ammunition—"enough to let us fire

Texas Plant Operating

Mineral Wells, Tex.

• • • A new \$100,000 steel plant designed to convert scrap metal collected from the public into steel bars was formally opened here recently.

The plant erected west of Mineral Wells, is operated by the Bateman Steel Co., of which W. W. Bateman is president. In construction of the plant, local capital was augmented by a loan from the Reconstruction Finance Corp.

NEED EQUIPMENT

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Galvanizing?

(Electro Process)

... ASK MEAKER!

Plating?

... ASK MEAKER!

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Pickling?

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Do It MECHANICALLY—Save Labor, Up Production!

The MEAKER co.

1635 SO. 55th AVE., CHICAGO

over 1500 bullets at every soldier in the Axis armies"—have been made.

Close to 60,000 tanks, more than 1,600,000 trucks and nearly 70,000 scout and other combat vehicles have rolled off the assembly lines of the two nations. Canada supplied about one-third of the truck total and close to 20,000 scout cars.

Production of ocean-going merchant vessels now has reached 20,000,000 dead-weight tons and the annual rate of production now is 22,000,000.

Not counting mosquito craft and auxiliaries, naval vessels totaling 2,000,000 displacement tons have been completed.

OPA Eases Adjustment Of Construction Pricing

Washington

• • • Provisions for the individual adjustment of maximum prices for contractors supplying construction services or who install building and industrial equipment in local shortage situations were announced July 6 by OPA.

The action provides for more expedient treatment of adjustment petitions by authorizing regional OPA administrators to deal with situations in which acute local shortages exist or threaten to exist. Local orders or regulations applying to a group or class of sellers may be issued by the regional officials.

Emergency Standard Set For Spot and Seam Welding

New York

• • • The American Welding Society has published a four-page bulletin on "Recommended Practices for the Spot and Seam Welding of Low Carbon Steel," based on data supplied by approximately 60 fabricators of mild steel structures and resistance welding equipment manufacturers. It is intended to meet needs of Navy and War Departments and war industries.

DO YOU NEED SAND CASTINGS NOW!

Our Modern Foundry Equipment
and Skill is at Your Service . . .

WE CAN PRODUCE THEM IN A HURRY!

● If you need sand castings in a hurry we can help. Our modern foundry can be placed at your service immediately for the manufacture of brass or other copper base alloy sand castings.

Ample capacity and the latest equipment PLUS experienced men who have the "know how" for the production of close tolerance work will assure you of uniform high quality castings with close grain structure.

We can furnish castings rough, machined, polished or plated. Our own Tool Room and Pattern Shop are ready to turn out any necessary tools or patterns if your job is in the blueprint stage. We manufacture a standard line of valve bodies of all kinds—STREAMLINE pipe fittings for heating, air conditioning, water works, plumbing and refrigeration use—OR TO YOUR OWN SPECIFICATIONS.

If you need castings in a hurry—WRITE US NOW.

MUELLER
BRASS CO.
PORT HURON, MICH.

#5
for thread production

[illegible]

140—THE IRON AGE, July 15, 1943

New Lists to Aid High Speed Steel Scrap

New York

••• In an effort to get producers, dealers and consumers of tool steel scrap more familiar with each others identity the OPA has issued a list of tool steel producers and a list of scrap dealers specializing in tool steel scrap. OPA is attempting through dissemination of this information to aid the movement of high speed steel scrap grades as they are the nation's most valuable secondary source of tungsten, molybdenum and cobalt.

The major consumers of tool steel scrap are the producers of tool and high-speed steel for sale. These companies include:

Allegheny Ludlum Steel Corp., Dunkirk, N. Y.; Braeburn Alloy Steel Corp., Braeburn, Pa.; Bethlehem Steel Co., Bethlehem, Pa.; Carpenter Steel Co., Reading, Pa.; Columbia Tool Steel Co., Chicago Heights, Ill.; Copperweld Steel Co., Warren, Ohio; Crucible Steel Co. of America, New York; Henry Disston & Sons, Inc., Tacony (Philadelphia); Heppenstein Co., Pittsburgh; Firth-Sterling Steel Co., McKeesport, Pa.; Ingersoll Steel & Disk Division, New Castle, Ind.; Jessop Steel Co., Washington, Pa.; Latrobe Electric Steel Co., Latrobe, Pa.; Simonds Saw & Steel Co., Lockport, N. Y.; The Midvale Co., Nicetown (Philadelphia); Universal-Cyclops Steel Co., Bridgeville, Pa.; Vanadium-Alloys Steel Co., Pittsburgh; Vulcan Crucible Steel Co., Aliquippa, Pa.

There are other companies which consume smaller amounts of tool steel scrap in the production of tool steels or alloying materials for their own use.

Some scrap dealers make a specialty of handling tool steel scrap. These dealers are known as tool steel scrap dealer-specialists. They are equipped to spark-test and in some cases to make a chemical analysis of the scrap; and they are recognized by several consumers as being qualified to properly segregate and analyze tool steel scrap. Some of these dealer-specialists are as follows:

Metallurgical Products Co., 35th and Moore Avenue, Philadelphia; Frankel Co., Inc., 1627 West Fort Street, Detroit; I. Schumann and Co., 2666 East 34th St., Cleveland; The M. N. Landay Co., 1304 Clark Building, Pittsburgh; The Philip G. Smith Co., Outer Drive and Pennsylvania R. R., Lincoln Park, Detroit; Chicago Alloy Products Co., 712 Liberty St., Chicago.

The above list of tool steel scrap dealer-specialists was furnished by the Institute of Scrap Iron and Steel, and may not include all tool steel scrap dealer-specialists.

education and training on the part of management.

Tool Conservation Campaign Launched by WPB

••• Declaring that tool breakage is a most critical factor today, Howard Coonley, director of WPB Conservation Division, has called upon industry to establish definite tool care policies within individual plants.

"Unless industry cooperates in reducing this abnormally high breakage by training its employees in the proper method of handling cutting tools, serious production effects may result, and the present shortages of tool metals will grow even more dangerous," Mr. Coonley said.

Although many plants have encouraged tool economy in varying degrees in the past, metal-working firms large and small must establish plant-wide conservation programs as a matter of management policy if machine tools are to be kept running and critical alloying elements conserved. Specialists in the Conservation Division and Tool Division of WPB point out that there is a high degree of breakage and spoilage of cutting tools on the part of green workers, about nine million of whom have been put on the job with only a minimum of training. Hence the WPB is projecting a program to encourage a great appreciation of tool values among workers, and an expansion of tool conservation

education and training on the part of management.

The campaign slogan "Tools are Weapons—Treat 'em Right" will be featured on all printed matter and plant campaign chairmen are requested to use it in connection with their local promotions. A limited amount of graphic material will be available, including three-color posters, small stickers, and news material for employees' magazines. The WPB Division of Information will give special assistance and data for use in plant campaigns.

The National Industrial Advertisers Association will assist, handling the campaign as an association project through its chapters located in 26 industrial centers. Plants where labor-management committees are organized will develop it through channels arranged by the War Production Drive Headquarters. WPB training specialists are asking municipal and state training directors to establish the program in connection with their courses for untrained workers.

One of the most important phases is the program to encourage the tipping of high speed tools. By reclaiming sections of broken or spoiled cutting tools by welding or brazing them to mild steel shanks, supplies of high speed steel can be greatly extended.

REMOVE SMUT FROM
COLD ROLLED STEEL

FASTER
with

OAKITE
COMPOSITION
No. 90

A NEW, basically different material that has been developed specifically to meet today's urgent wartime need for greater SPEED and THOROUGHNESS in anodic degreasing of cold rolled steel parts before electroplating, Oakite Composition No. 90 gives you these SIX important advantages:

SPEEDIER REMOVAL of smut, oil, grease, buffing and drawing compounds
FASTER wetting-out action

MINIMIZES and controls foaming in automatic cleaning and plating equipment

SPECIAL emulsifying properties that provide greater mineral oil tolerance
LONGER solution life

MORE UNIFORM results that assure smoother-running production

Get the Complete Story!

Let us demonstrate how this superior material can expedite your reverse current cleaning operations... help you increase output and reduce rejects! Write today for full information. There's no obligation, of course.

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Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE
Specialized cleaning

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Plan for Coalition Bloc to Decentralize Steel Is New Method

Washington

• • • Seeking to decentralize the iron and steel industry, Senator Pat McCarran, Democrat of Nevada, proposes to use an instrumentality that is not common to most former Congressional proposals to deal with the industry.

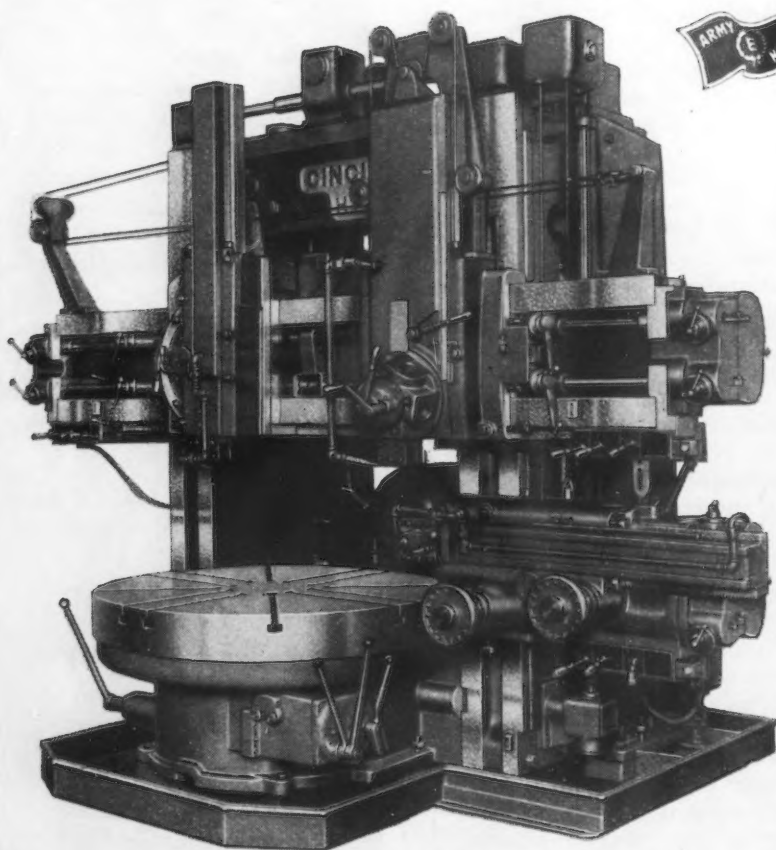
Senator McCarran wants "new and expanded facilities" for the production of iron and steel. He proposes to do this job, attempted times without number by members of Congress, by the formation of a coalition bloc of 56 senators.

The Senator's precise method of

operation through the Senate bloc, yet to be organized—and there is doubt that he will find 55 adherents—was not made clear at his office. Likewise the nature of the "new and expanded facilities" was not explained except in a nebulous way. The fact that the Senator, in a letter to 55 other Senators, urges the coalition to promote decentralization of the iron and steel industry, and to foster new facilities, would indicate that he has legislation in mind, but this was not admitted. The suggestion of appropriations to build facilities also met with the statement that no specific plan has been charted. The kind of facilities is equally as hazy except that it does appear rather clearly that the scheme is in part a renewed push, which western senators have long been making, to have sponge iron plants built in their particular states. It was stated, however, that Senator

Cincinnati

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• This 64" Boring Mill, now available for early delivery, is the heaviest manufacturing type mill of its size. Write today for illustrated bulletin 1301 describing many exclusive Hypro-duction features.

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PLANERS • PLANER MILLERS • VERTICAL BORING MILLS

SCHOOLBOY APPRENTICE: Donald Clark, 16, member of the first group of Westinghouse transformer division trainees who will be able to finish high school on time through alternating two weeks in class with two weeks of shop work, is shown learning from Louis Wood, veteran machine repairman, how to read a hand scale properly when measuring a transformer part.





**WE TAKE
NO CHANCES**

Today or Tomorrow



Interruptions in crane service would tie up our production — cause serious delays in delivering the vital equipment that is so urgently needed.

That's why we insist, now as always, upon reliable P&H Electric Cranes. P&H's 60-year leadership in crane building means something to us. It means that we can depend upon them to meet today's peak production... and tomorrow's need for lower cost.

P&H is America's largest and only crane builder producing complete electrical crane equipment.

General Offices: 4401 West National Ave., Milwaukee, Wis.

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CORPORATION
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McCarran has in mind the possibility of building rather completely integrated plants in some of the states—Nevada included—which are represented by the Senators to whom he addressed his letters. The move has not as yet been taken with great seriousness, and will not be pressed immediately.

"With Congress about to take a summer recess, it probably is advisable to defer formal organization of such a group (Senate bloc) until ses-

sions are resumed in September," said the Senator in his letter which was written before Congress recessed last Thursday. "In the meantime, I should greatly value an expression of your opinion concerning the proposal. If, during the recess, a sound framework can be outlined with such Senators as yourself, I am convinced that we can undertake, in the fall, a program of aggressive action, with a similar group in the other (House) side of the Capitol, which should be productive

of substantial benefit to the national interest as a whole, and to a score or more of individual states, yours and mine among them."

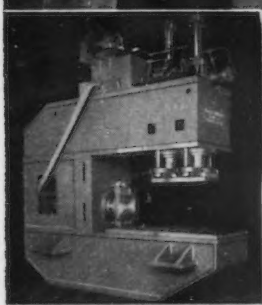
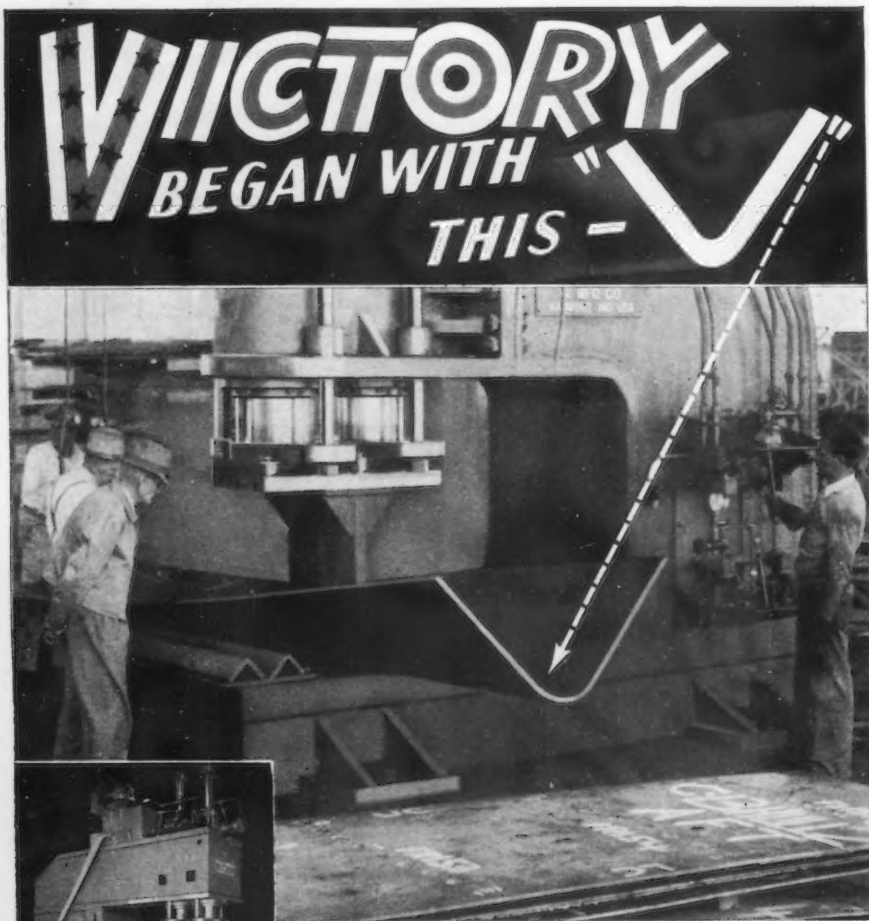
The Senator would not "decentralize" the iron and steel industry by dispersal of present plants, but by building new units of an indefinite character. He complained that the acknowledged "steel centers" now account for about 90 per cent of the country's iron and steel output. His appeal to his 55 colleagues was based on the fact that their states have iron ore and coal deposits.

Senators to whom McCarran wrote were:

Bankhead and Hill of Alabama; Hayden and MacFarland of Arizona; Caraway and McClellan of Arkansas; Johnson and Downey of California; Johnson and Millikin of Colorado; George and Russell of Georgia; Clark and Thomas of Idaho; Gillette and Wilson of Iowa; Capper and Reed of Kansas; Barkley and Chandler of Kentucky; Bilbo and Eastland of Mississippi; Clark and Truman of Missouri; Wheeler and Murray of Montana; O'Mahoney and Robertson of Wyoming; Scrugham of Nevada; Hatch and Chavez of New Mexico; Bailey and Reynolds of North Carolina; Nye and Langer of North Dakota; Thomas and Moore of Oklahoma; McNary and Holman of Oregon; Gurney and Bushfield of South Dakota; McKellar and Stewart of Tennessee; Connally and O'Daniel of Texas; Thomas and Murdock of Utah; Glass and Byrd of Virginia; Bone and Wallgren of Washington; Kilgore and Revercomb of West Virginia; LaFollette and Wiley of Wisconsin.

CHAINS FOR HITLER: Important links in the chain that will crush the Axis are the Coast Guard's operation and maintenance of navigation aids. At the Charleston, S. C., Coast Guard base a coxswain and a machinist's mate check chains for Coast Guard boats.

Wide World Photo

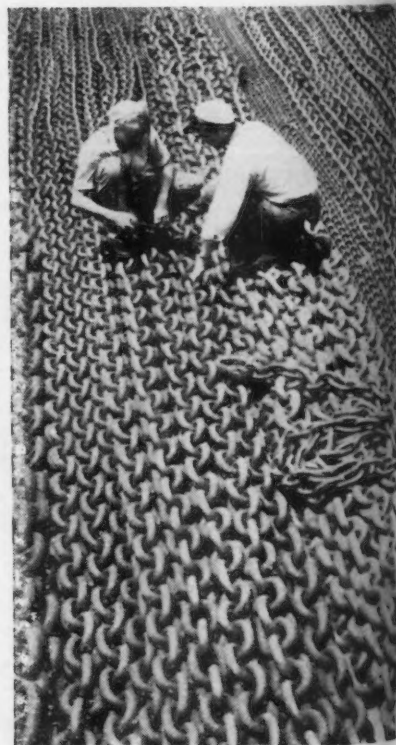


Beatty designs and builds heavy duty punches, shears, coping machines, forcing presses, extruding presses, hydraulic forming presses, bulldozers

Widely used by shipbuilders, and other fabricators of heavy metal, the Beatty 400-Ton Hydraulic Forming & Flanging Press has the power, speed and adaptability to break production bottlenecks. Of very latest design, this unit, with its unique type pump and valve design, eliminates the need for cooling coils, with their inherent threat of water entering the oil supply line. If you work in heavy metal, there is a Beatty machine to help smooth out your production wrinkles. Write us.



BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA



"PUT IT ON THE BLANCHARD"

ONE operator on this No. 16-A2 Blanchard Automatic Surface Grinder produces 1970 steel connecting rod caps per hour, ground on the joint face. He can load and unload the 34 station automatic clamping fixture as the stations pass in front of him. The wheel control calipers take care of the sizing automatically.

.040" to .070" of stock is removed from these connecting rod caps to limits of $\pm .001$ ". A minimum of 90% flat bearing surface is produced.

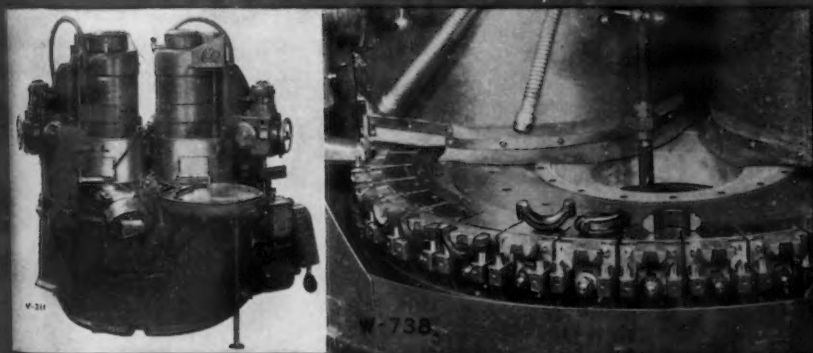
The **BLANCHARD**
MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS.



CHECK THESE ADVANTAGES OF BLANCHARD GRINDING

- ★ Production
- Adaptability
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- Fine Finish
- ★ Flatness
- Close Limits

★
..... Especially
valuable on jobs like
the one illustrated.



Grinding Connecting Rod Caps on No. 16-A2
Blanchard Automatic Surface Grinder.



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

Severe Blow Dealt OPA Grade Labeling And Standardization

Washington

• • • OPA's hopes of establishing additional grade labeling and standardization for the remainder of this year have been dealt a severe jolt. This was done when the Senate refused to strike out a House approved amend-

ment from the current war agency appropriations bill.

The amendment proposed in the House by Representative Andersen of Minnesota, provided that no OPA funds be used for the promulgation or enforcement of orders requiring grade labeling or standardization of food products, wearing apparel or other processed or manufactured commodities or articles.

However, in a later clarifying

amendment suggested by Price Administrator Brown, OPA was permitted to follow its standardization rules based on present grades of commodities in setting price standards, proving that Congress had no intention of disturbing existing OPA grade labeling and standardization regulations.

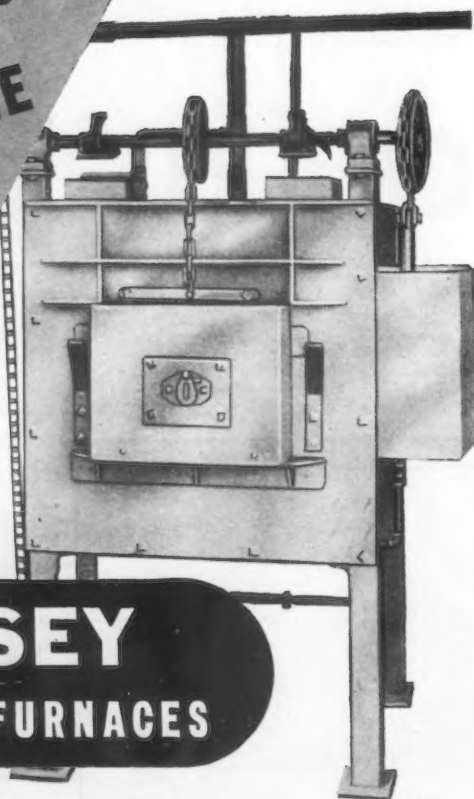
The Senate's acceptance of the grade labeling amendment in its original form made it impossible for OPA to institute any grade labeling move until the next appropriation bill comes up for legislative action. The amendment was offered in the Senate by Senator Taft of Ohio.

Senator Taft, in response to an attempt by Senator McKellar of Tennessee, to strike out the proviso preventing the use of funds for grade labeling and standardization said: "I do not know whether any senator has read the rayon hosiery order which was issued in an attempt to standardize women's stockings. It covers some 20 pages. It has upset the entire trade and has resulted in great objection from the trade."

Senator Vandenberg of Michigan asked that, if anyone desired to standardize or socialize American business, would not the elimination of the proviso prohibiting grade labeling provide one of the major methods of approach. Taft replied that "it certainly would." It is part of a general program and the Ohio senator said that he did not think it should be necessary to argue the matter.

The Senate action brings an end, for the present at least, to the bitter controversy which has raged for months between the supporters and opponents

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Automatic Mixer
FOR
**SINGLE VALVE
CONTROL**



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Not only the gas-fired models, but every DEMPSEY oil-fired semi-muffle furnace is equipped with modern fuel-air mixer to permit manual or automatic single valve control. This feature alone is worth your investigating, but in addition, DEMPSEY offers you such innovations as safety weight guard, silicon carbide hearth, fuel saving damper control, heavy insulation and the costlier, heavier construction of properly ribbed cast-iron front bolted to welded steel housing. 14 standardized sizes completely designed and available for prompt delivery . . . shipped assembled with piping manifold. Other sizes built to order.

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Combined 50 years' experience building Dempsey and Gilbert & Barker Furnaces for all heat treating needs
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Operate your drill presses and radials to capacity with Apex Safety Friction Tapping Chucks



**Guaranteed to minimize tool break-
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and help inexperienced operators
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In every detail, Apex safety friction chucks are *right*. Made of finest material for the job, precision built throughout. Easy to adjust, and once adjusted, maintain proper tension over long periods. End thrust set up by tapping or pressure exerted by the operator does not affect friction setting. Friction disc element can be replaced quickly and at low cost when necessary. Used for tapping thru and

bottom holes, drilling, reaming, stud setting, nut setting, spot facing, counterboring . . . wherever tool is apt to break. Shanks supplied for all requirements. Tap capacities up to 3". Considering today's conditions, reasonably good deliveries are obtainable.

How to save time on orders: Make sure you give type and tool numbers. If non-standard tools are called for, make a drawing or sketch, or give complete specifications. This will insure prompt handling of your order and prevent possible delay for lack of information. Write for complete catalog of Apex Production Tools.

APEX

THE APEX MACHINE & TOOL CO., DAYTON, OHIO

Manufacturers of friction chucks, quick change chucks, positive drive chucks, vertical float tapping chucks, semi and full floating tool holders, stud setters, screw drivers, power bits, universal joints, plain and universal joint socket wrenches.

of grade labeling. Business interests in opposing grade labeling and the elimination of brand names have had strong support in Congress.

Price Administrator Brown then proceeded to tell Senate leaders that should Congress adopt the conference report on the war agencies appropriation bill, with its restrictive amendments, it would wreck OPA and virtually bring price control to an end.

Brown objected specifically to the

conferees action in slashing the agency's appropriation from \$177,000,000 to \$155,000,000, prohibition of the use of any funds for the promulgation or enforcement of orders requiring standardization of certain commodities, and the amendment requiring price officials to have had previous business experience in each commodity upon which the official works.

In a letter to Majority Leader Alben

Foremen to Hold Convention By Radio

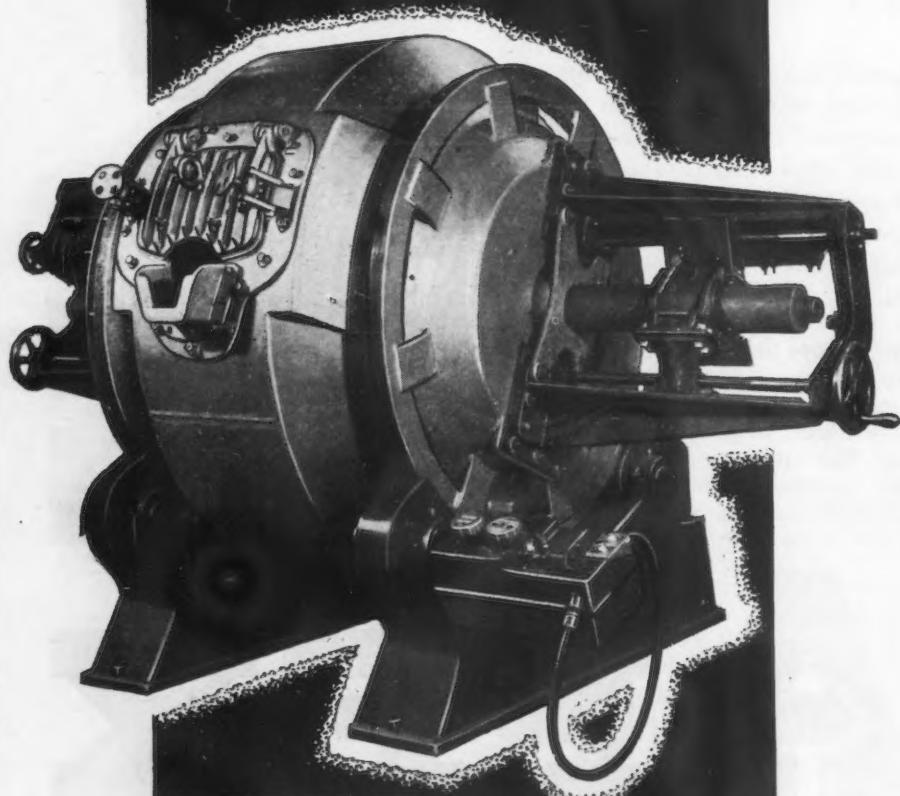
Dayton, Ohio

• • • The first rational convention ever held by radio will be staged in September over a nationwide network by the National Association of Foremen.

Desire to aid in the war effort by eliminating the convention's normal demand for transportation and hotel accommodations for several thousand men and by enabling the associations members to remain on their jobs in war time production inspired his committee's novel plan, according to Mr. Ireland, vice-president of the association. The network program will be limited to one hour. Member clubs of the Association will hold local meetings at which they will listen to the broadcast.

BETTER PRODUCTION BETTER CASTINGS...

Detroit furnaces are used for triplexing, duplexing, or cold melting any desired number of hours per day on large heats or small. Versatile, flexible and fast melting, these furnaces insure highest quality metallurgical results under accurate control. They save labor, metal, fuel and time. Their inherent economy is further enhanced by their frequent use of salvage materials such as borings, turnings and other scrap. Write today for further facts and prices.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

Barkley the OPA head particularly criticized the amendment prohibiting grade labeling and standardization.

The Price Administrator affected deep concern over the legislation as it was passed. He said that if the amendment on standards means that OPA is barred from making use of minimum standards in establishing ceiling prices, it would stop all enforcement activities on 265 price regulations. Actually this concern had no real basis, for clearly it was not the intent of Congress to disturb existing grade labeling and standardization. But the Brown amendment was accepted merely as a matter of removing any doubt on the point.

Reduction in the appropriation bill will cut OPA's funds below the present operating rate, Mr. Brown said, and refusal to grant more funds for enforcement will make it impossible to add many more needed enforcement officials.

"The enforcement program by reason of the limitation on amount, I am told by my enforcement people, will break down," he wrote.

Mr. Brown also asked that OPA be permitted to buy commodities without entrapment from suspected violators to obtain evidence for prosecution, as is permitted in other governmental enforcement agencies. The Senate had approved this authority, but it was removed by conference action. This means that OPA would have been able to buy material from suspected violators without obligating OPA to prosecute.

Some of the many and varied parts inspected by Jones & Lamson Optical Comparators.



PRODUCTION INSPECTION BY OPTICAL PROJECTION

Comparison Inspection of production parts and products with **Jones & Lamson Optical Comparators** sets new standards for speed and accuracy in production inspection.

The most complex forms can be inspected with a rapidity and precision unobtainable by other methods, by operators with a minimum of training or experience.

There is a **Jones & Lamson Optical Comparator** for every need in the field of inspection by optical projection, and our inspection engineers are ready to study your inspection problems and make recommendations based upon more than twenty years experience in this field.

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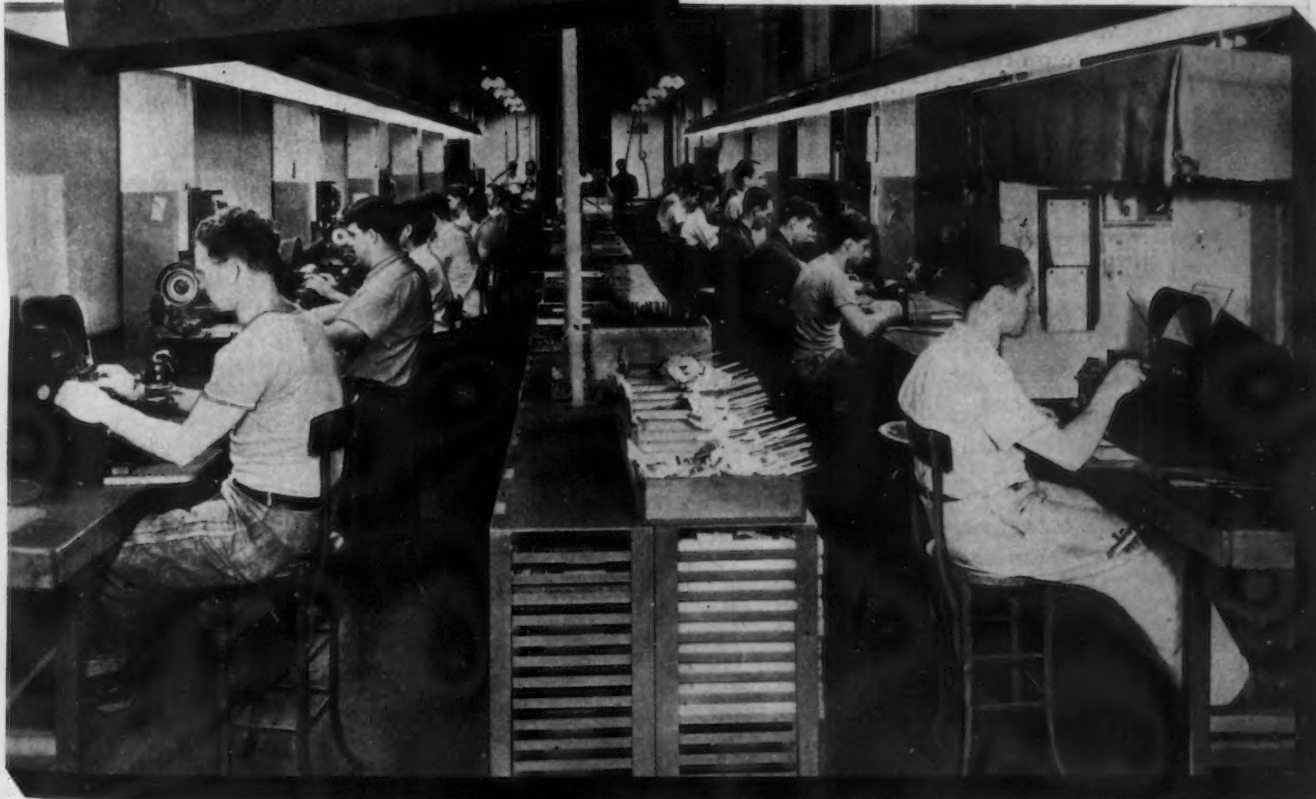


Photo courtesy The Eastern Machine Screw Corporation.

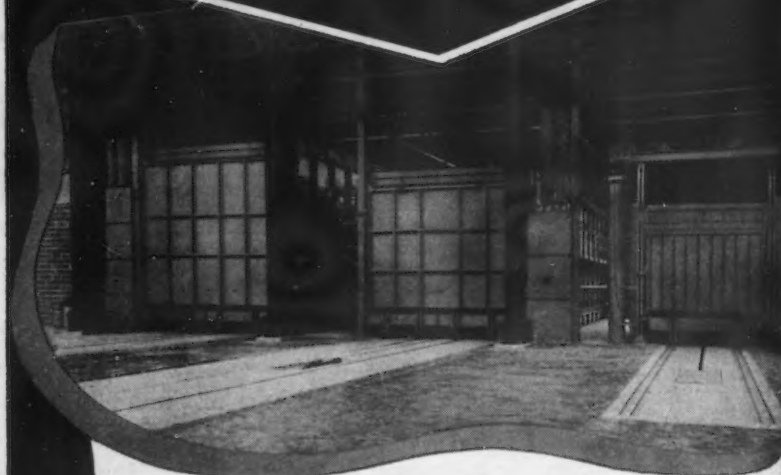


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Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.
Profit-producing Machine Tools

Total Load—475 Tons!



This battery of recently installed Car Hearth Annealing Furnaces has a combined load of 475 tons—a whale of a lot of tonnage.

The furnace on the left is 18-foot wide, 16-foot high and 50-foot long; capacity, 200 tons. The center installation is of equal length and capacity but it is only 16-foot wide and 12-foot high. The smaller furnace on the right has a capacity load of 75 tons and is 9¾-foot wide, 6-foot high and 27-foot long. All are equipped with modern temperature control and operating apparatus including chain-type car hauls.

Here, then, is an up-to-the-minute battery of R-S Furnaces that will play no small part in swinging the balance of production for Victory.

Write for details and illustrated Car Hearth Bulletin No. 68-F.

FURNACE DIVISION
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 PLATE AND ANGLE HEATING



R-S Furnaces of Distinction

NEWS OF INDUSTRY

Two Blades for One

• • • Two propeller blades out of the steel normally required for one is the remarkable result of a new steel rolling method reported to Armco shareholders last week by Charles R. Hook, president of American Rolling Mill Co. Cited as one of the leading advances of the year in the steel industry, Mr. Hook said the process not only saved steel but also required less machining time on the propeller blades.

U. S. Steel's Shipments Decline to 1,552,663 Tons

• • • Shipments of finished steel products by subsidiary companies of the United States Steel Corp. for the month of June, 1943, were 1,552,663 net tons, compared with 1,706,543 net tons in the preceding month (May) a decrease of 153,880 net tons, and with 1,774,068 net tons in the corresponding month in 1942 (June) a decrease of 221,405 net tons.

For the year 1943 to date, shipments were 10,040,016 net tons compared with 10,503,507 net tons in the comparable period of 1942, a decrease of 463,491 net tons.

Decentralization Reversed

Washington

• • • The transfer from New York to Washington of the functions and personnel of the former WPB Construction Division has been completed, WPB has announced. In a recent reorganization of the Facilities Bureau, the name of the Construction Division was changed to Project Division.

Navy Opens Chicago Office

Chicago

• • • As a further step in the decentralization of naval material procurement, the Navy Department has opened an office here at 135 So. La-Salle St., for the purchase of supplies for the Ninth naval district. The office is in charge of Capt. Robert A. Shotwell, Jr., with Comdr. E. B. Erickson his assistant. The district covered by this office accounts for about 25 per cent of the entire naval shipbuilding program.

Another regional office will be opened shortly by the Navy in Los Angeles.



NICKEL AIDS THE AUTOMOTIVE INDUSTRY to *KEEP 'EM ROLLING!*

Using ingenuity and "know-how" born of long experience, automotive engineers designed the phenomenally successful transport equipment that now speeds the United Nations on the road to Victory.

Built to take punishment far above peacetime requirements, these specialized military vehicles are being produced in quantity by the mass-production methods that have amazed the world. From North Africa to the South Pacific, these trucks, jeeps, tanks and half-tracks have repeatedly met wartime demands for stepped-up performance.

This kind of engineering-thinking

pioneered the application of Nickel alloyed materials. Now, when uninterrupted operation is so vitally important, the continued and widespread use of Nickel is clear evidence of its many advantages.

In steering knuckles or differentials, in forged gears or cast blocks, a little Nickel goes a long way to provide essential dependability. It improves strength/weight ratios, increases wear and corrosion resistance, imparts toughness, and assures uniform properties of the other metals with which it is combined.

Today, maintenance crews on far-off battle fronts are learning what metal-

lurgists and engineers here long have known . . . that, properly used, Nickel aids to "keep 'em rolling."

For years the technical staffs of International Nickel have been privileged to cooperate with automotive engineers and production men . . . men whose work is now so necessary to the Nation. Counsel, and printed data about the selection, fabrication and heat treatment of ferrous and non-ferrous metals is available upon request.



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MADE ACCURATELY by the MILLIONS

Oliver's modern facilities for making bolts, nuts and rivets provide the advantages and economies of mass production while maintaining *accuracy* and *quality*.

Although these useful and necessary fasteners are turned out by the millions—you will find they fit what they are supposed to fit, go together readily, hold tight.

For standard or special bolts, nuts, rivets or related products, call in the Oliver representative.

OLIVER
IRON AND STEEL
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PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

Limited Supplies May Hamper Tool Production

Washington

• • • Manufacturers of tools are advised that the materials for tools production will probably be restricted, therefore an early application for controlled materials needed during the fourth quarter should be made. This information has been sent manufacturers by John S. Chafee, Director of the Tools Division, WPB. He said, "At the present time it appears that material will be restricted, and consequently it is specially important for the applications to be on time so that materials available may be allotted on a realistic basis."

Bethlehem Denies Carrier Violation Charged By Gov't

• • • In answer to a government injunction suit charging violation of the commodities clause of the Interstate Commerce Act, the South Buffalo Railway Co., Bethlehem Steel Co., and Bethlehem Steel Corp. denied the charge. The companies asked for a dismissal of the complaint, which alleged that the defendants maintained a shipper-carrier combination prohibited under the clause.

Mexico Included In Decentralization Plan

Washington

• • • The BEW Office of Exports put into effect on July 1 its so-called "Decentralization A" in Mexico for a long list of commodities, including aluminum, copper, iron and steel and other metals. In Mexico, Export Recommendations will be issued for all these commodities by the Comité Coordinador de las Importaciones, Mexico City. Export Recommendations in Mexico have replaced the certificates of necessity and will be used in the same manner as Import Recommendations in other countries.

The list of these commodities is in four parts: (1) Controlled materials (exclusive of Class B products which are listed in Part 4); (2) Certain noncontrolled materials, metals, chemicals and drugs; (3) Certain fabricated products, not containing controlled materials; and (4) Class B products.

COMING EVENTS

- Oct. 13 to 16—The Electrochemical Society, Inc., New York.
- Oct. 18 to 22—National Metal Congress and Exposition, Chicago.
- Oct. 28, 29—American Institute of Mining Engineers and American Society of Mechanical Engineers, Pittsburgh.



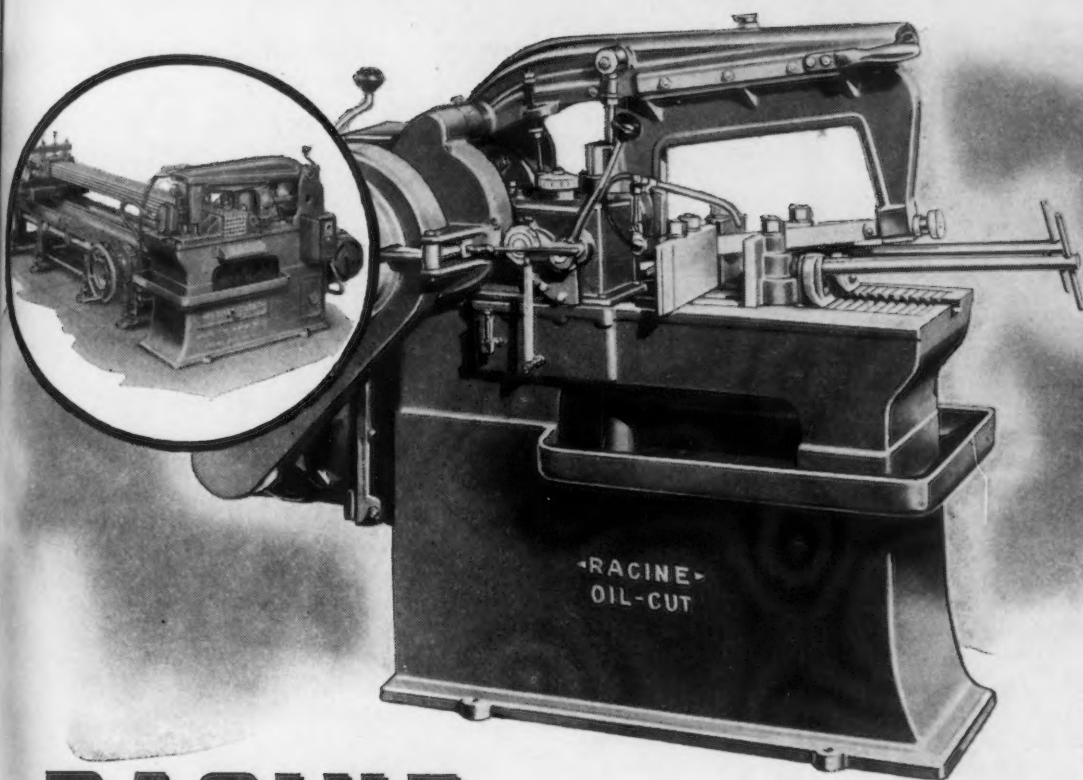
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Whether you buy fasteners by the box, keg or carload, you can insure the satisfaction and economy of accurately made products by specifying OLIVER!

Furthermore, you will find in the complete line of Oliver bolts, nuts and rivets hundreds of styles and sizes of standard products to choose from.

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METAL CUTTING MACHINES

THE PRODUCTION SAWS OF MODERN INDUSTRY

Operation No. 1 in Your Metal Cutting Department

Start your production line with Racine accuracy—in the cutting of bars, tubing, and structural shapes.

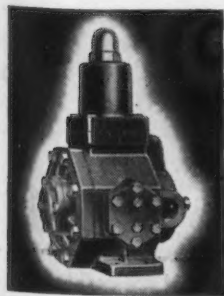
This dependable accuracy is the result of Racine's rigid construction features and the Racine type of self-compensating, flexible hydraulic feed.

Racine was first to successfully apply the smooth oil-cushioned operation of hydraulic action to a power hack saw machine. Simple automatic hydraulic control of feed and pressure make Racine preferred by the inexperienced operators as well as the experienced oper-

ators in today's high speed war production. A single lever controls feed, clutch, transverse and neutral operating action—all from one operating position.

And Racine's extra heavy pivot shaft and wide pivot bearing in saw guide arm, prevents cocking or binding strain—greatly lengthening the life of the machine.

Investigate Racine's wide range of sizes—capacities 6" x 6" to 20" x 20". Racine Automatic Hydraulic Stock Feed Machines—that bring new labor-saving features to any metal cutting operation—are also available.



RACINE Variable Volume HYDRAULIC PUMPS

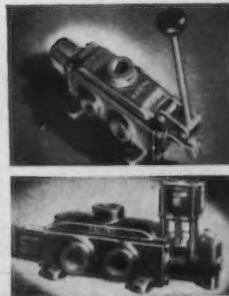
A Modern Source of Hydraulic Force

A new "high" in vibrationless action is made possible by Racine Oil Hydraulic Pumps for any operation of feeding, bending, forming, holding or molding. Only Racine has the "Vane Type" Variable Volume feature—no relief valves are required. It pumps only the required amount of oil needed to do the job. Pressures from 50 to 1000 lbs. per sq. in. at 0 to 30 gal. per min.

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The exclusive Racine "Sleeve Type" and "Balanced Piston" construction provides larger bearing and sealing area. Piston cannot sag. Shock is reduced to a minimum in hydraulic circuit, because of Racine's unique "porting" design. These four-way valves are available with stem, lever, roller, latch, foot treadle and solenoid operating devices. Made in 3/8" to 1 1/2" standard pipe sizes. "Custom-made" porting arrangements can be supplied to suit your specific requirements.



Racine's Hydraulic specialists will be glad to help you with your hydraulic application problem—with no obligation. Immediate attention will be given your request for complete information and prices on Racine Saws or Hydraulic Pumps and Valves. Address Dept. IA-S



RACINE TOOL and MACHINE COMPANY

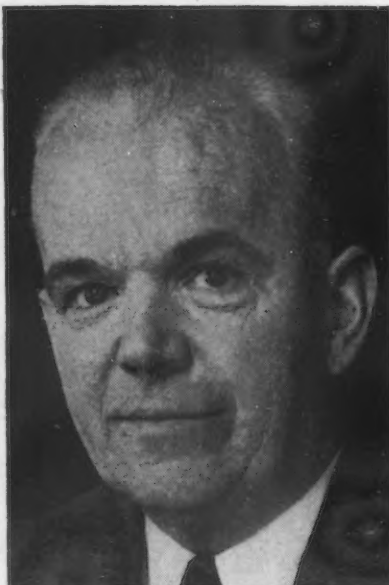
STANDARD FOR QUALITY AND PRECISION

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PERSONALS

• **P. M. Fleming** has been appointed vice-president in charge of sales and operations of Pittsburgh Rolls Division, Blaw-Knox Co., Pittsburgh. Mr. Fleming formerly was vice-president in charge of sales. **Ralph H. Scholl**, sales engineer, has been appointed manager of sales; **S. Clifford Elms**, chief engineer, has been appointed general superintendent; and **W. H. White**, general superintendent, has been appointed metallurgical engineer in charge of research and new developments.

• **E. W. Kempton** has been appointed assistant vice-president, industrial relations, U. S. Steel Corp. of Delaware. **Edward C. Myers** has been made assistant to vice-president, industrial relations. Mr. Kempton entered the steel industry at the Worcester plant of the American Steel & Wire Co. in 1919. After holding various positions in the industrial relations department, he was appointed director of industrial relations at the headquarters office of American Steel & Wire at Cleveland in 1933. Mr. Kempton came to Pittsburgh in 1941 as assistant director of industrial relations for U. S. Steel Corp. of Delaware and had served in that capacity until the time of his present appointment. Mr. Myers was first employed in the safety department



P. M. FLEMING, vice-president in charge of sales and operations, Pittsburgh Rolls Division, Blaw-Knox Co., Pittsburgh.

of Homestead Works, Carnegie-Illinois Steel Corp., in 1934, and became director of personnel of that plant in 1937. He came to U. S. Steel in a public relations capacity in 1938 and later became assistant director of public relations for the Pittsburgh district, subsequently being transferred to the industrial relations department as

senior staff assistant in charge of personnel.

• **George A. Silva** has been appointed superintendent of locomotive maintenance of the Boston & Maine Railroad, Maine Central Railroad & Portland Terminal Co. Mr. Silva, who has been superintendent of the Boston & Maine's Billerica locomotive repair shops will take over his new duties immediately. **Walter H. Ohnesorge** will succeed Mr. Silva. He has been assistant superintendent of the Billerica shops.

• **George Montague Williams**, a veteran figure in the aviation and automotive industries, has joined Curtiss-Wright Corp., and will shortly be elected a vice-president to assist the president in an executive capacity. Mr. Williams was formerly assistant to the chairman of the board of Consolidated-Vultee Aircraft Corp., on leave of absence from the Russell Mfg. Corp., Middletown, Conn., of which he is president. Mr. Williams became interested in aviation before World War I when he joined the H. E. Talbott Co., of Dayton, Ohio, in 1911, as chief engineer and was assigned to build a flying field for the Wright Field Co. When the Dayton Wright Airplane Co. was organized in 1917 he was made assistant to the president and later, general manager. Mr. Williams left Wright in 1922 to become president of the Wire Wheel Corp. of America. In 1924 he took over the management of the Marmon



E. W. KEMPTON, assistant vice-president, industrial relations, U. S. Steel Corp. of Delaware.



EDWARD C. MYERS, assistant to vice-president, industrial relations, U. S. Steel Corp. of Delaware.



GEORGE M. WILLIAMS will shortly be made a vice-president of Curtiss-Wright Corp., New York.

Motor Car Co. He remained with Marmon until 1934 when he became president of the Russell Mfg. Co., of Middletown, Conn.

• **J. L. Mauthe** has been appointed vice-president in charge of operations of the Youngstown Sheet & Tube Co., to succeed the late William B. Gillies. In his new position, Mr. Mauthe will have charge of operations of the company's Youngstown and Chicago district manufacturing properties as well as supervising all its mining properties. He joined Youngstown in 1935 as assistant superintendent of the company's Campbell plant, and became general superintendent of the district in 1937.

• **Joseph L. Mullin** has been appointed general superintendent of foundries for the American Manganese Steel Division of the American Brake Shoe Co. Mr. Mullin joined the company in 1914 as clerk in the annealing department. He rose through successive stages to the positions of local purchasing agent and foundry superintendent, becoming works manager at the New Castle, Del., plant, in 1928. W. F. Kelly, plant superintendent at New Castle, has been named works manager at that place to succeed Mr. Mullin. He joined the American Manganese Steel Division in 1925 and has advanced through various positions.

• **James M. Morehouse** has been appointed general manager of the order division, sales department, Carnegie-Illinois Steel Corp., Pittsburgh. He succeeds Merle N. Smith, who is retiring after more than 48 years' service with this U. S. Steel subsidiary. Mr. Morehouse was first employed as an order sorter in the order office of the company in 1909. After advancing through various positions he was made chief clerk of the order department's Bar Division before coming to the Pittsburgh general office in 1938. Since his transfer he has held several executive positions and prior to his present appointment was assistant general manager of the order division.

• **Harold S. Falk**, president of the Falk Corp., Milwaukee, has been elected a director of the Wisconsin Telephone Co., Milwaukee.

• **Capt. H. A. Thorndike**, manager of the H. D. Hudson Mfg. Co., Oshkosh, Wis., has resigned to devote his full time to the March Engineering Co. of that city which he organized a year ago. He will be succeeded at Hudson by H. D. Younburg, Chicago.



J. L. MAUTHE, vice-president in charge of operations, Youngstown Sheet & Tube Co., Youngstown.

• **Stowell C. Wasson**, manager of Indianapolis Works, National Malleable & Steel Castings Co., will be transferred to Chicago July 31 to become manager of the company's two plants in that area, at Cicero and Melrose Park. Mr. Wasson's entire business career has been spent with the Indianapolis Works, beginning in the sales department in 1911. He was made sales agent in 1922 and later promoted to works manager. He will be succeeded as the Indianapolis Works by R. S. Davis, who has been

assistant manager of that plant since 1929. Mr. Davis came to the Indianapolis Works in 1917 as a draftsman. W. M. Ewing has been elected manager of the Sharon, Pa., plant, succeeding Walton L. Woody, whose election as vice-president was recently announced. Mr. Ewing was formerly general superintendent of the Sharon plant. Joseph O. Houze, manager of the Cicero Works since 1926, is retiring. He completed 40 years with the company in January. Specializing in labor relations, Mr. Houze was transferred to the general offices of the company in Cleveland in 1920 as general personnel director, remaining there until he went to Cicero. Houston L. Hiatt, Cicero Works sales manager, is also resigning after 44 years of service with the company, the greater part of which was spent as salesman and sales manager of the Chicago plant.

• **T. W. Shook**, has been appointed director of sales development and service at Basic Refractories, Inc., of Cleveland. Mr. Shook was formerly manager of operations in Ohio and Nevada. Prior to joining the Cleveland company, he was managing director of British Ceramic Service Co. Ltd., in Great Britain. Gordon Adams has been made works manager not only of the company's operations at Maple Grove and Bettsville, Ohio, but also the brucite operations at Luning, Nevada. A. M. Weaning, who has been Mr. Adams' assistant since 1940, has been appointed superintendent of production at Maple Grove and Bettsville.

OBITUARY...

• **Dr. William J. Foster**, former assistant engineer of General Electric's alternating-current engineering department, died at his home in Schenectady, July 2, after a brief illness. He was 82 years of age. Dr. Foster joined the General Electric Co. at its Lynn Works in 1893. Until his retirement in 1929, he took an active part in the design of every important alternating-current machine built by the company. For many years, he was responsible for the electrical design of all synchronous machines, and in this way he was a leader in the gradual transition from revolving-armature, smooth-core machines to modern deep-slot, revolving-field machines of tremendously increased ratings.

• **James E. MacMurray**, founder and former chairman of Acme Steel Co., Chicago, died recently at Pasadena,

Cal. He was president of Acme for 38 years, and became board chairman until his retirement several years ago. Mr. MacMurray was 80 years of age.

• **Charles P. Chase**, vice-president and general manager of the New England Coal & Coke Co., died June 27. He joined the company in 1915 and was considered a leading authority on coal marketing. Mr. Chase was 66 years of age.

• **Charles L. Bransford**, Birmingham district manager for Republic Steel Corp. from 1938 to 1941, died June 11 at his home in Birmingham, aged 56 years. Before becoming associated with Republic in 1929 as superintendent of blast furnaces and coke ovens at Birmingham, he had served in various executive capacities. For a short time before his death, Mr. Bransford was a vice-president of the Lone Star Steel Co., Daingerfield, Texas.

MACHINE TOOLS

... News and Market Activities

Renegotiation Worries Tool Builders

Chicago

••• After discussion with some of the largest machine tool builders throughout Ohio, there is little doubt that renegotiation is still the immediate major headache, and will likely result in considerable trouble and possibly in some instances failure of the less substantial builders. Renegotiation as it exists under the present laws will hit every manufacturer in the country, but practically the whole machine tool industry has or is at present going through this mill now. Warner & Swasey Co., Cleveland, was one of the first builders renegotiated, and is credited by fellow machine tool companies as the torch bearer in this regard. Warner & Swasey's actions have been and are being closely observed and will likely prove to be the pattern for other manufacturers as they are faced by the service price adjustment boards.

There seems to be no question among manufacturers that renegotiation is a good feature. However, the severity of the penalty under present handling of the law is too often likely to affect the stability of the producers for years to come. In most instances, builders have expanded production facilities during the past three years almost as fast as they had the money to do it. Now, price adjustment boards are asking for huge amounts of money to be returned to the government, and builders do not have it. Of course, the money is in the company, but usually is tied up in buildings, production tools and equipment, and in order to pay the renegotiation bills, such assets might have to be partly liquidated.

Also, there is the question of equality. Some machine tool builders have been allowed greater profits on almost identical contracts than have others. This is considered quite unjust and may lead to a breakdown of the law. The price adjustment boards of both the Army and Navy have admitted publicly that there is no established method of renegotiation, and each case is a "new one unto itself." Consequently, where one group of examiners will be lenient, another group will not. The War Department Price Adjustment Board admitted that it

was lenient with manufacturers on many scores to permit a "post-war contingency fund," whereas the Navy, which may be renegotiating an identical contract, denies having ever permitted any consideration for post-war reconversions.

In addition to all of these objectionable characteristics, and there are many more cited by manufacturers who have been renegotiated, there has yet to be issued by any price adjustment board an order demanding payment to the government of any sum of money. Several machine tool builders have asked for such orders, but so far as is known, none has ever received such written demands. From this, it appears quite obvious that the various renegotiating boards prefer to keep these matters out of the courts, and would like to have manufacturers "cooperate" in making refunds to the government.

Where the difficulties of renegotiation will lead the machine tool industry cannot yet be foretold. Many are holding up payments for various reasons. Some would like to be ordered to pay, while others prefer to await the outcome of current investigations in the House of Representatives, conducted by the House Naval Affairs Committee and the House Ways and Means Committee. It is hoped by the latter group that amendments to the present law will define in clearer terms how renegotiation procedure will be handled and perhaps will tend toward greater leniency. The builders who await orders to pay do so with the hope that such demands can be legally contested. Being the "guinea pigs" of all American industries, the renegotiation of the machine tool builders will be widely and closely observed.

Fair Demand Seen In Post-War Tool Market

Cincinnati

••• While acknowledging that the peak war business is not likely to be attained again, opinion seems to be prevalent in the Cincinnati area that a pessimistic picture of the future in the machine tool industry is grossly

overdrawn. For the rest of the war period, it is anticipated that there will be a reasonably good demand for new tools which is being reflected in the present situation. The first four months of the present year's business was considerably off, but in many quarters satisfactory improvements in new business during the last few months is reported. This new business, of course, is not producing large quantity orders, but is producing a larger volume of small quantity orders. The trend seems to be well diversified and is scattered over a large number of consumers.

In line with the general situation, machine tool manufacturers here, while acknowledging that the available supply of employable men is not great, are not eagerly seeking additional employees, but are permitting the factory forces to ease down. A number of plants have gone into the production of other items than machine tools and still others are preparing manufacturing facilities to take care of other products.

British Cancel Tool Orders, Presaging An End of Imports

Cleveland

••• Recent British dispatches on the slow-down and uncertain future of the machine tool industry in that country have been brought home to the American industry by abrupt cancellation of British orders for 800 turret lathes and millers.

British machine tool production is now eight or ten times greater than at any time during or since the last war, and added to this have been Lend-Lease imports probably at least as great. The recent cancellations seem to presage the end of Britain's machine tool importing period and to herald a hunt for export markets.

Domestic cancellations are reported to have been increasing fairly rapidly also, probably partly because of the screening process to which WPB is subjecting all orders.

Opinion differs as to whether this July and August will show the normal vacation slump, during which purchasing decisions are pokey. Last year the usual slump was another war casualty.



MARVEL SAWS

One of these saws "paid for itself in 3 months on two storehouse orders" in a prominent Railroad Shop

Innumerable locomotive shops have modernized their cutting-off methods by installing MARVEL Hack Sawing Machines. While the selection of the saws for each shop depends largely on the capacity range of the work to be encountered in the individual shop, the saws illustrated are typical selections: A No. 18 MARVEL Giant Hydraulic (capacity 18" x 18") shown above for cutting large size bars, billets or forgings, such as locomotive axle stock; and a No. 9A MARVEL Ball Bearing High Speed Hack Sawing Machine (capacity 10" x 10") equipped with an automatic bar feed, illustrated at right, cutting-off 8" stay bolts from 1" bars, 27 at a time.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave.

CHICAGO, U. S. A.

Eastern Sales Office: 225 Lafayette St., New York



NON-FERROUS METALS

... News and Market Activities

Japan Expands Light Metal Industry

... The Axis press recently contained an interesting review of Manchurian light metal industry developments, *Metal Bulletin*, London, reports. The production of light metals in this puppet State of Japan increased between 1936 and 1941 by 1666 per cent, according to official claims. As a result the Japanese Empire has become self-sufficient, whereas at one time it had to import these metals. Subsequent to 1933 numerous expeditions were made into districts previously not investigated in order to find mineral deposits. Extensive bauxite deposits were located.

The most important alumina shale deposits are found to some extent in the provinces of Fengtien, Jehol, Lungkiang, Kwantung and Chinchow, lying in the districts of Fuchou, Takueichiatur, Yentai, Hanpolnig, Sungshutai, Wutaoling, Hungloyen, Takaokon, Weitzukon, Hsia Heyukon and also in Shuangshantu (Antung province). In addition, there are the better-known and leading producing areas of Penshihu, Hsiaoshih, Niushintai and Tienshiuhfu—all in the province of Fengtien. As regards the reserves in 1940-41 these were officially stated to be:

ALUMINA SHALE RESERVES		
	Tonnage	Per Cent
Yentai	1,034,000	45 to 41.4
Penshihu	3,202,000	40 to 47.3
Niushintai	9,382,000	46 to 52.5
Shaoshin	5,930,000	25.3 to 55
Others	5,771,000	37.2 to 55
Total	25,319,000	

Meanwhile, this figure must have been increased by discoveries in other districts.

These reserves remained unused until the demand of armament industry in Japan and Manchuria called for the erection of big plants. The first step in developing production was taken by the South Manchuria Railway Co., which built the first reduction plants and at the same time established a modern laboratory also at Fushun to investigate light metals. A short time later steps were taken at the Central Research Institute of the South Manchuria Railway Co. to discover the best and cheapest process of production and to undertake further technical development. In order to regulate better light metal production, the Manchuria Light Metals Co. was formed in 1938 with a strong government interest; some years later

it was put under the supervision of the Manchuria Industrial Development Corp. The capital of this holding company amounted in 1940 to 450,000,000 yuan. It made a profit that year of 31,000,000 yuan and the dividend for the first half of 1940 was 5 per cent on the government shares and 10 per cent on the privately-owned shares. Many Japanese and Manchurian concerns are closely connected with this corporation, including the Nippon Mining Co. and Osaka Iron Works.

For its production, the Manchuria Light Metals Co. draws raw materials from the districts mentioned above. Electrical energy is obtained from the Fushun Colliery Power Station. Coke is also used. The chief product is aluminum, plus a number of other materials which are valuable for the working up of metals. In order to meet the constantly increasing demand for light metals, the construction of a big reduction plant was begun in 1937 and this commenced operations about a year later. Development plans for 1938, 1939 and 1940 were carried out despite certain delays and a big plant at Antung was able to commence production. These works are all favored by good transport facilities.

New Aluminum Ingot Grade Defined

Primary grade aluminum ingot—a new grade of ingot made by blending 50 to 70 per cent of scrap with primary metal has been provided with maximum prices by the OPA.

The new ceilings are: For No. 142 primary grade ingot, 15½c. a lb.; for No. 355 ingot, 15½c. a lb., and for No. 195 ingot, 15c. a lb.

To stimulate orderly movement of aluminum ingot made of scrap, WPB now is allocating virgin aluminum to smelters for blending with scrap in the production of the critical casting alloys, No. 142, No. 355, and No. 195, OPA said.

Under the new program smelters will be able to blend from 50 to 70 per cent of scrap with primary pig and produce a primary grade ingot comparable in every respect with ingot produced solely of primary metal.

The cost to the smelter will be in-

creased, however, since the primary pig costs 3c. a lb. more than the highest grade scrap. As the primary grade ingot produced from blending primary and scrap metal is identical to the primary ingot sold by producers of virgin aluminum, the maximum prices established for Nos. 142, 355 and 195 ingot made by primary-scrap blending are established at the same levels as those for the same primary alloys.

Prices for the new primary grade ingot are established in Amendment No. 1 to Maximum Price Regulation No. 2 (Aluminum Scrap and Secondary Aluminum Ingot), and became effective July 12.

WPB to Buy Nickel Salts

Washington

... Now that the holders of nickel salts have reported their inventories to the WPB, an offer is being made to the private owners to purchase such idle stocks for war purposes. The prices offered vary from 10c. a lb. for nickel ammonium sulphate to 27.5c. per lb. for nickel carbonate.

Stocks of nickel salts sold to the government under this program will be resold by the government for war purposes and any resulting loss therefrom will be absorbed by the government. For nickel salts which are purchased under the terms offered, the government will pay the following prices:

Nickel sulphate	11.5c. lb.
Nickel ammonium sulphate ...	10.0c. lb.
Nickel chloride	14.0c. lb.
Nickel carbonate	27.5c. lb.

These prices are f.o.b. shipping point, and apply to commercially pure salts of standard manufacture such as are used by nickel platers, and which are dry, unused, clean, dirt-free, and properly packaged.

Britain and Bolivian Tin

... The British government, according to the *Metal Bulletin*, London, is worried over the possibility of a rise in the price paid for Bolivian tin by Metals Reserve Co. The Bolivian tin producers are negotiating for an increase to make the price 70c. a lb. f.o.b. South American ports. If the United States concedes a higher price for Bolivian tin, the British Government will have to do the same. This would mean a Government subsidy that was well over £100 a ton.

NON-FERROUS PRICES

Refiner, Smelter Quotations

(Cents per lb.)

Copper, electrolytic, Conn. Valley.....	12.00
Copper, electrolytic, New York.....	11.75
Copper, Lake	12.00
Tin, Straits, New York.....	52.00
Zinc, East St. Louis.....	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, virgin 99+%, delivered....	15.00
Nickel, electrolytic, base refinery.....	35.00
Magnesium, 99.9+%, carlots	21.50
Magnesium, 12-in. sticks, carlots.....	30.00
Cadmium, delivered	90.00

ALUMINUM, No. 12 foundry grade (No. 2), 13.50c. per lb.; steel deoxidizing grades, 12.50c. to 13.75c. per lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. Laredo, Tex., smelter. MERCURY, \$191 to \$193 per 76-lb. flask, f.o.b. shipping point or port of entry. BRASS INGOTS, commercial 85-5-5-5 (No. 115), 12.25c. a lb. COBALT, 97 to 99 per cent, \$2.11 per lb. BERYLLIUM COPPER, 3.75 to 4.25 per cent Be., \$15 per lb. contained Be. GOLD, U. S. Treasury, \$35 an oz. INDIUM, 99.5 per cent, \$10 per troy oz. IRIIDIUM, \$165 per troy oz. PALLADIUM, \$24 per troy oz. PLATINUM, \$35 per oz. SILVER, open market, New York, 44.75c. per oz. ARSENIC, prime, white, 99 per cent, 4c. per lb.

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; red brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c.; 95 per cent, 21.28c.; manganese bronze, 28.00c.; muntz metal, 22.75c.; naval brass, 24.50c.; phosphor bronze, grades A, B, 5 per cent, 36.25c.; Everdur, Herculey, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.37c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c.; 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculey, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall; 2S, 40c. per lb. (1/2H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, finish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb. base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity extras.

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 23 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in.

thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

Variation from the above size, temper, finish and quantity require extras.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Group 1

No. 1 wire, No. 1 heavy copper...	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper...	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable...	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings...	10.50
Tinny (phosphor bronze) solids...	10.50
Copper-nickel solids and borings...	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition) ..	9.00
Soft red brass borings (No. 1)	9.00
Gliding metal turnings	8.50
Unlined standard red car boxes ..	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings ..	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

Group 3

Yellow brass soft sheet clippings...	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors ..	7.50
Manganese bronze solids	7.25 ¹
	6.25 ²
Manganese bronze borings	6.50 ¹
	5.50 ²

Group 4

Automobile radiators	7.00
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Group 5

Refinery brass	5.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c. a lb.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	3.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of 1/2c. a lb. For lots over 19,999 lb. add 1 1/2c. a lb. to prices listed.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	3.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cents per lb., f.o.b., shipping point.)	
New zinc clippings, trimmings	7.25
Engravers', lithographers' plates ..	7.25
Old zinc scrap	5.75
Unsweated zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under 1/2 per cent, 26c. per lb.; 90 to 98 per cent nickel, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25%
Electrolytic, full size, 22 1/2c., cut to size	30%
Rolled, oval, straight, 15 in. and longer	23 1/4
Curved	24 1/4
Brass: Cast, 82-20, elliptical, 15 in. and longer	23%
Zinc: Cast, 99.99, 16 in. and over	16 1/4
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., for quantities, based on delivery from New York City)

Copper cyanide, tech., 100-lb. bbls.	34
Copper sulphate, 99.5 crystals, bbls. 1-5	5.65
Nickel salts, single, 425-lb. bbls.	13-13.5
Silver cyanide, 100 oz. lots ..	40.82-41 1/4
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33
Zinc sulphate, 89% crystals, bbls.	6.8

SCRAP

... News and Market Activities

Trade Feeling First Coal Strike Effects

••• The first big call for scrap in months came this week in Pittsburgh as a direct result of the recent coal strikes and the subsequent heavier use of scrap. A leading steel producer in the area originated the call asking for all available scrap during the week thus converting an easy market situation into a very tight one almost overnight. Dealers are reported diverting all possible scrap and business is brisk.

The coal strike and resulting fuel shortage which even last week had 14 blast furnaces in the Pittsburgh-Youngstown district out of production, has created an excessive use of scrap in both open hearth and blast furnaces and has been further aggravated by the hot metal shortage occurring when blast furnaces went off. Blast furnaces have been more heavily charged with scrap to facilitate melting with less fuel, and open hearths have been kept operating in the face of a hot metal shortage by heavier scrap charges.

This first report of brisk scrap movement due to coal strike conditions naturally originated in Pittsburgh where mills were hardest hit by coal shortages and are still having trouble with recalcitrant miners. No other district has reported similar results although it was also expected from the Birmingham area. Latest reports from the South indicate that miners have mostly returned and with the flow of coal resumed no serious effect on scrap trading is anticipated.

Most other sections of the country report slow trading for the most part and in many cases, slow collections, too. Mid-West sections such as St. Louis where heavy collections are expected from farm areas have noted a sharp decline as farmers concentrate on harvests. Noticeable increase in mill rejections of light offerings has been reported as lightweight inventories loom large. By contrast, mills in most areas are demanding heavy melting grades.

Several indications point toward a tighter scrap situation sometime this Fall. An increasing number of blast furnaces off for repair by that time may further aggravate the hot metal shortage; new production units coming into operation during this year's closing months may increase the demand noticeably; collections

which have been poor in many sections are not expected to improve with the onset of bad weather; and labor for yards and collection work probably will continue to become more scarce due to both the temptation of war plant wages and the draft. In addition, while nobody cares to predict such at this time, the makings of another coal strike are ready for the Oct. 1 deadline set by John L. Lewis which may again precipitate an excessive scrap demand.

Dinner Meet Scheduled For Scrap Institute Chapter

Chicago

••• The Chicago chapter of the Institute of Scrap Iron & Steel will hold a dinner meeting at the Hotel Sherman here on July 19 according to an announcement by William Pohn, president of the chapter. Edwin C. Barringer, national president and executive secretary of the Institute is scheduled to be present with representatives of both WPB and the OPA.

Scrap Markets

ST. LOUIS—Receipts of scrap in the St. Louis industrial district are falling off noticeably and mills are losing ground on their inventories, which now amount to about three weeks supply. Farmers are too busy in the fields to gather scrap, and there is a shortage of men to handle it.

PITTSBURGH—Dealers here are diverting as much steel making scrap as possible to the leading interest which is short of pig iron due to the coal strike. As predicted, what some people had called an easy scrap market here has changed overnight to a tight one. The coal strikes have caused a drain on scrap inventories which might be reflected later in the year by a much tighter situation. Substantial amounts of scrap and pig iron will be needed then if new steel units coming in are fully utilized.

CINCINNATI — Outside of a fair amount of production scrap there is not much other material now flowing into the market. Dealers seem to express some concern over the future of the market, because of the failure of scrap to flow in adequately, reported to be caused by the lack of manpower and the disinclination on the part of dealers to make an effort to obtain more materials. The trade generally reports an increased amount of rejections as consumers become more particular in the type of material they will accept. One large interest in the area, which has been out of the market for several months, has now returned, but it is reported that the present trickle of ma-

terial has not been sufficient to supply this interest with the amount it needs.

BUFFALO—With mills rather heavily stocked with light scrap, an increasing number of rejects by consumers was reported in the trade this week. One of the leading consumers was reported to have clamped down on further deliveries of light scrap, demanding heavy melting stock, of which there is none in this district. Scrap shipments by Lake continued to prove disappointing but numerous barge loads were reported en route via canal from the New York City area.

BOSTON—Aside from shipments to old line customers, yards and brokers are doing practically nothing. As has been the case for months, they are not soliciting new accounts. Mill rejections of materials because of alloy scrap and scarcity of labor are still the two big headaches of the trade. Scrap is not coming into the yards in any great quantity. Receipts just about offset regular customer shipments, consequently there is little accumulation. Allotments of shipyard scrap are still being made, but so far as can be ascertained no battlefield scrap has been received in this area.

NEW YORK—Although the months of July and August are usually dull as far as the scrap business is concerned, conditions in this district are even quieter than normal. Dealers have hardly enough scrap to make up a carload. The present high cost of labor and a price schedule set under conditions existing over two years ago has made the profit margin too narrow for many of the yards. Several small yards have closed.

PHILADELPHIA—Mills in this area can use more heavy cast and charging box size cast grades for their open hearths. There is also a shortage of short blast furnace turnings. The surplus of low phos scrap reported last week may be dissipated in the next few days. On July 12, the Philadelphia Navy Yard sold 1000 tons of mixed ferrous and non-ferrous scrap. The awards were not made public the early part of this week.

CHICAGO—Downward trend in movement of steel scrap continues in this area, with market observers failing to see any possibility of a reversal of this trend in the near future. To counterbalance this situation, allocations at the moment are rather heavy in this area. Meanwhile the scrap trade and mill buyers are emphasizing the need for more publicity on the urgency of the situation.

CLEVELAND — Scrap supplies, by grades, are spotty. Cleveland and the Canton-Massillon area has been working on a hand-to-mouth basis on turnings for some weeks. In the Middletown and Newport districts there have been ample supplies of turnings.

With an increasing shortage of scrap turnings, one producer in the eastern Ohio area previously using between 12 and 15 per cent in the form of turnings, it is now barely getting 8 per cent.

Pittsburgh, M.
Butler, M.
Johnstown
Steubenville
Youngstown
Cleveland, C.
Cincinnati
Chicago, C.
Canton, O.
Ashland, K.
Buffalo, N.
Bethlehem
Duluth, M.
Detroit, M.
Toledo, O.
St. Louis, M.
Atlanta, G.
Birmingham
Pittsburgh
Minneapolis
Seattle, W.
Baled

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Chica
Spe
Birmi
Sar
Buffa
Detro
Dulur
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SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				Low Phos.		Heavy Structural and Plate			Foundry Steel				Alloy Free Low Phos. and Sulphur	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Bk. Shts. No. 1 & 2 Busheling	Unbaked* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Bloom, Forge Crops	Bar Crops, Punch- ing Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank- shafts				
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$15.00	\$15.00	\$16.00	\$17.00	\$17.50	\$25.00	\$22.50	\$21.50	\$22.00	\$22.50	\$21.50	\$22.00	\$21.00	\$21.50	\$18.00	\$19.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point..	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75	
Ashland, Ky.....	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50	
Buffalo, N. Y.....	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25	
Bethlehem, Pa.; Kokomo, Ind.....	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25	
Duluth, Minn.....	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00	
Detroit, Mich.....	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85	
Toledo, Ohio.....	17.50	12.85	12.85	13.85	14.85	15.35	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50	
St. Louis, Mo.....	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50	
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00	
Minnequa, Colo.....	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50	
Seattle, Wash.....	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.50	15.00	12.50	14.00	15.50	

*Baled turnings are \$5 per gross ton higher.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles. No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at \$14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above

for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced—\$2; 75 to 85% Fe—\$4; under 75% Fe—\$8 per ton. Mill scale of 65% or more Fe—\$8 per ton. Mill cinder and grindings, shipping point maximum price of \$4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP							CAST IRON SCRAP			
No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails				Group A	Group B	Group C	
			3 ft. and Under	2 ft. and Under	18 in. and Under					
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00	No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown.....	21.00	22.00	23.50	24.00	24.25	24.50	Clean auto cast.....	18.00	19.00	20.00
Chicago, Philadelphia, Sparrows Pt., Wilmington..	19.75	20.75	22.25	22.75	23.00	23.25	Unstripped motor blocks.....	15.50	16.50	17.50
Birmingham, Los Angeles, San Francisco.....	18.00	19.00	20.50	21.00	21.25	21.50	Stove Plate.....	17.00	18.00	19.00
Buffalo.....	20.25	21.25	22.75	23.25	23.50	23.75	Heavy Breakable Cast.....	15.50	16.50	17.50
Detroit.....	18.85	19.85	21.35	21.85	22.10	22.35	Charging Box Size Cast.....	17.00	18.00	19.00
Duluth.....	19.00	20.00	21.50	22.00	22.25	22.50	Misc. Malleable.....	20.00	21.00	22.00
Kansas City, Mo.....	17.00	18.00	19.50	20.00	20.25	20.50				
Kokomo, Ind.....	19.25	20.25	21.75	22.25	22.50	22.75				
Seattle.....	15.50	16.50	18.00	18.50	18.75	19.00				
St. Louis.....	18.50	19.50	21.00	21.50	21.75	22.00				

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

BASE PRICE SEGREGATED			BASE PRICE UNSEGREGATED SOLIDS		BASE PRICE UNSEGREGATED TURNINGS	
Solids, Lb. Cont. W	Turnings, Lb. Cont. W		\$1.50 per lb. contained W if 5% or more.	\$1.30 per lb. contained W if 5% or more.		
Type 1.....	\$1.80	\$1.60	\$1.15 per lb. contained W if over 1% and less than 5%.	\$1.00 per lb. contained W if 1% and less than 5%.	Type 2.....	1.60
Type 2.....	1.60	1.40			Type 3.....	1.25
Type 3.....	1.25	1.25			Type 4*.....	0.125
Type 4*.....	0.125	0.105	\$0.80 per lb. contained Mo if 1½% or more.	\$0.70 per lb. contained Mo if 1½% or more.	Type 5*.....	0.135
Type 5*.....	0.135	0.115				

*Per lb. of scrap material.

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)...	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 163 to 171.

Composite Prices . . .

FINISHED STEEL	
July 13, 1943	2.25513c. a Lb.....
One week ago	2.25513c. a Lb.....
One month ago	2.25513c. a Lb.....
One year ago	2.26190c. a Lb.....

	HIGH	LOW
1943.....	2.25513c.,	2.25513c.,
1942.....	2.26190c.,	2.26190c.,
1941.....	2.43078c.,	2.43078c.,
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16
1939.....	2.35367c., Jan. 3	2.26689c., May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2
1933.....	1.95578c., Oct. 3	1.75836c., May 2
1932.....	1.89196c., July 5	1.83901c., Mar. 1
1931.....	1.99626c., Jan. 13	1.86586c., Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Pig Iron: (Per Gross Ton)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
No. 2 fdy., Philadelphia...	\$25.84	\$25.84	\$25.89	\$25.89
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.68
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.39
Basic, Valley furnace....	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago...	31.34	31.34	31.34	31.34
Ferromanganese	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

‡For carlots at seaboard.

Scrap: (Per Gross Ton)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Heavy melt'g steel, P'gh...	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Furnace coke, prompt...	\$6.50	\$6.50	\$6.50	\$6.00
Foundry coke, prompt...	7.50	7.375	6.875	6.875

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	July 13, 1943	July 6, 1943	June 15, 1943	July 14, 1942
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

PIG IRON	
.....23.61 a Gross Ton.....	
.....23.61 a Gross Ton.....	
.....23.61 a Gross Ton.....	
.....23.61 a Gross Ton.....	

	HIGH	LOW
23.61	\$23.61	\$23.61
23.61	23.61	23.61
23.61, Mar. 20	\$23.45, Jan. 2	
23.45, Dec. 23	22.61, Jan. 2	
22.61, Sept. 19	20.61, Sept. 12	
23.25, June 21	19.61, July 6	
23.25, Mar. 9	20.25, Feb. 16	
19.74, Nov. 24	18.73, Aug. 11	
18.84, Nov. 5	17.83, May 14	
17.90, May 1	16.90, Jan. 27	
16.90, Dec. 5	13.56, Jan. 3	
14.81, Jan. 5	13.56, Dec. 6	
15.90, Jan. 6	14.79, Dec. 15	
18.21, Jan. 7	15.90, Dec. 16	
18.71, May 14	18.21, Dec. 17	

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL	
.....\$19.17 a Gross Ton.....	
.....\$19.17 a Gross Ton.....	
.....\$19.17 a Gross Ton.....	
.....\$19.17 a Gross Ton.....	

	HIGH	LOW
\$19.17	\$19.17	\$19.17
19.17	19.17	19.17
\$22.00, Jan. 7	\$19.17, Apr. 1	
21.83, Dec. 30	16.04, Apr. 1	
22.50, Oct. 3	14.08, May 1	
15.00, Nov. 22	11.00, June 1	
21.92, Mar. 30	12.67, June 1	
17.75, Dec. 21	12.67, June 1	
13.42, Dec. 10	10.33, Apr. 1	
13.00, Mar. 13	9.50, Sept. 1	
12.25, Aug. 8	6.75, Jan. 1	
8.50, Jan. 12	6.43, July 1	
11.33, Jan. 6	8.50, Dec. 1	
15.00, Feb. 18	11.25, Dec. 1	
17.58, Jan. 29	14.08, Dec. 1	

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point ↓ Product													10 DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Young- stown	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢
Electrolytic tin plate, box	\$4.50	4.05¢	\$4.50												
Black plate, 29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹²			3.37¢
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢ ¹³	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)						2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
									(Coatesville and Claymont = 2.10¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.31¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE ⁹															
Bright ¹⁰	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

¹ Mill run sheets are 10c, per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 29,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Boxed. ¹² Portland and Seattle price, San Francisco price is 2.50c. ¹³ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. **SEMIFINISHED STEEL**—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. **ALLOY STEEL BARS**—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

PRICES

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 43)

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	†† Hot Rolled, 2300	† Hot Rolled, 3100	†† Cold Drawn, 2300	† Cold Drawn, 3100
*Philadelphia	\$3.518	\$4.872 ⁵	\$5.018	\$3.922	\$4.772	\$3.605	\$3.666	\$3.822	\$4.072		\$7.116		
*New York	3.590	4.613 ²	5.010	3.974 ⁶	4.774	3.768	3.758	3.853	4.103	6.008	7.158	7.303	8.453
*Boston	3.774	4.744	5.224	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.312	7.344	8.484
*Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052				
*Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
*Washington	3.596	4.841	5.196	4.041	4.741	3.796	3.930	3.941	4.041				
*Chicago	3.25	4.20	5.23 ⁴	3.60	4.65 ⁸	3.55	3.55	3.50	3.75	5.75	6.90	6.85	8.00
*Milwaukee	3.387	4.337 ²	5.272 ⁴	3.737	4.787 ⁸	3.687	3.697	3.637	3.887	5.987	7.137	7.087	8.237
*Cleveland	3.35	4.40	4.977	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
*Buffalo	3.35	4.40	4.75 ⁴	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
*Detroit	3.45	4.50	5.00 ⁴	3.70	5.909 ⁸	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.309
*Cincinnati	3.425	4.475 ²	4.825 ¹	3.675	4.711	3.611	3.691	3.611	4.011				
*St. Louis	3.397	4.247 ²	5.172 ⁴	3.747	4.931 ⁸	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
*Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.00
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
*Omaha	3.865	5.443	5.608 ⁴	4.215		4.165	4.165	4.115	4.443				
Indianapolis	3.45	4.25	5.01 ¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Birmingham	3.45 ³	4.75 ¹	3.70 ³			3.55 ³	3.55 ³	3.50 ³	4.43				
Memphis	3.85	4.66	5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	3.95	4.85	5.25	4.20		3.90	3.90	4.10	4.60				
Houston	3.75	5.43	5.25	4.30		5.25	5.25	3.75	4.50				
Los Angeles	4.95	7.15	5.95	4.90		4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
San Francisco	4.55	7.55	6.60	4.50		4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
Seattle	4.65 ⁷	6.63	5.70 ⁷	4.25		4.75	4.45	4.20	5.75		8.00		

N. E. STEELS

(Hot Rolled Mill Extras for Alloy Content)

Designa- tion	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Man- ganese	Phos- phorus Max.	Sul- phur Max.	Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/.33	1.60/1.90	.040	.040	.20/.35				.10c	\$2.00		
NE 1335	.33/.38	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1340	.38/.43	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1345	.43/.48	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1350	.48/.53	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 8020	.18/.23	1.00/1.30	.040	.040	.20/.35			.10/.20	.45	9.00	.95c	\$19.00
NE 8442*	.40/.45	1.30/1.60	.040	.040	.20/.35			.30/.40	.90	18.00	1.40	28.00
NE 8613	.12/.17	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8615	.13/.18	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8617	.15/.20	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8620	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8630	.26/.33	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8635	.33/.38	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8637	.35/.40	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8640	.38/.43	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8642	.40/.45	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8645	.43/.48	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8650	.48/.53	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8720	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.20/.30	.80	16.00	1.30	26.00
NE 9255	.50/.60	.70/.95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/.65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/.65	.75/1.00	.040	.040	1.80/2.20	.20/.40			.65	13.00		
NE 9415	.13/.18	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30c	\$26.00
NE 9420	.18/.23	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9422	.20/.25	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9430	.28/.33	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9435	.33/.38	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9437	.35/.40	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9440	.38/.43	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
*E 9442	.40/.45	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9445	.43/.48	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9450	.48/.53	1.20/1.50	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9537*	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9540*	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9542*	.40/.45	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9550*	.48/.53	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9630	.28/.33	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9635	.33/.38	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9637	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9640	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9642	.40/.45	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9645	.43/.48	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9650	.48/.53	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: ¹ 500 to 1499 lb. ² 400 to 1499 lb. ³ 400 to 3999 lb. ⁴ 450 to 1499 lb. ⁵ 1000 to 1999 lb. ⁶ to 1999 lb. ⁷ 300 to 10,000 lb. ⁸ 2000 to 39,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

†† For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'd.

* Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

*Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; f.o.b. Duluth, billets only, \$2 higher. Delivered prices do not reflect new per cent tax on freight rates.

Per Gross Ton

Rerolling	\$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	\$54.00

Shell Steel

Per Gross Ton

1 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are \$2.00 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer	\$34.00
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Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared ...	1.90c.
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Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland ...	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.

High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 202
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

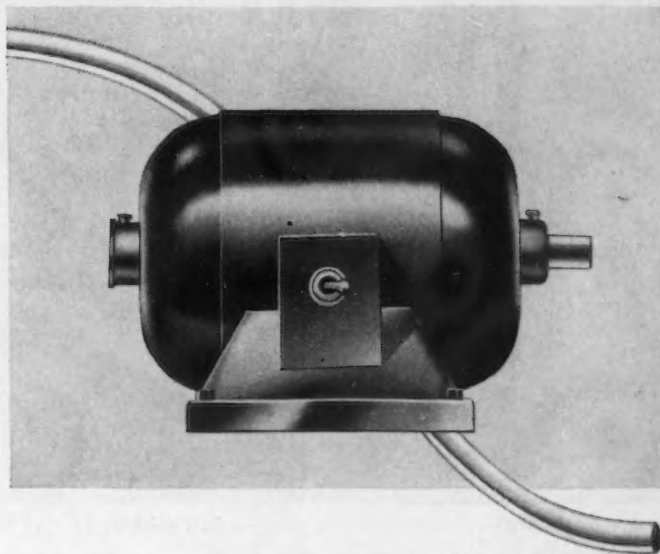
	No. 410	No. 430	No. 442	No. 446
F. Billets 15.725c. 16.15c. 19.125c. 23.375c.				
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip 17.00c. 17.50c. 24.00c. 35.00c.				
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.
Sheets	19.00c.

*Includes annealing and pickling.

PAGE *Stainless Steel* WIRE



BINDING WIRE FOR ARMATURES

may be one of the prosaic uses of PAGE STAINLESS STEEL WIRE. But its higher tensile strength and non-magnetic qualities have added no little to the performance of modern war-time AC motors.

Tensile strength, corrosion resistance and non-magnetic qualities of Page Stainless Steel Wire have called for its use in Aircraft Control Cables in planes for the American air arm and for our allies.

And PAGE STAINLESS STEEL SPRING WIRE controls the mechanism of one of the most effective of modern small arms.

Yes, the PAGE mill has been producing a large volume of Stainless Steel Wire for years and has acquired priceless data on the working qualities of "Stainless." Keep this in mind when planning ahead. We will be glad to cooperate with you at any time, even if current capacity is available only for war production.

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, San Francisco, Portland



In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT



Drilling hardened steel Rolls-Royce camshaft with **HARDSTEEL** drill.

Eliminate Expensive Grinding Drill Hardened Steel Parts with "HARDSTEEL" Drills

You can speed production and cut costs by eliminating grinding operations—simply use "HARDSTEEL" drills to drill, ream, countersink and counterbore steel parts hardened by any process—without annealing.

One manufacturer of push rods for aircraft engines saved \$7500 annually on grinding wheels alone when "HARDSTEEL" drills made unnecessary a single grinding job.

"HARDSTEEL" drills work with ease in hardened steels—even in steels of the work hardening types. And the harder the material—the easier it is to drill.



Drill after hardening—cut your rejects—insure parts matching at assembly—by using this new drill according to the complete instructions in the "HARDSTEEL" Operator's Manual—24 pages of practical information—and yours for the asking. *Write for it today.*

BLACK DRILL COMPANY
5005 Euclid Avenue • Cleveland, Ohio

"YOU HARDEN IT... WE'LL DRILL IT"

"HARDSTEEL"

DRILLS • REAMERS • TOOL BITS • SPECIAL TOOLS



PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:	Per Cent Off List
1/2 in. & smaller x 6 in. & shorter	65 1/2
9/16 & 5/8 in. x 6 in. & shorter	63 1/2
3/4 to 1 in. x 6 in. & shorter	61
1 1/4 in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/4 to 1 1/2 in. inclusive	57
1 3/4 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S. SAE
7/16 in. and smaller	64
1/2 in. and smaller	62
5/8 in. through 1 in.	60
9/16 to 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 3/4 in. and larger	56

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	60

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, on lots of 200 lb. or over.

Large Rivets (1/2 in. and larger)	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$2.75

Small Rivets (7/16 in. and smaller)	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 6

Cap and Set Screws

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	Per Cent Off List
Upset set screws, cup and oval points	71
Milled studs	60
Flat head cap screws, listed sizes	60
Fillister head cap, listed sizes	60
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb. gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points) Per Gross Ton	\$40.00
Light rails (from billets)	\$3.00
Light rails (from rail steel)	\$3.00

Cut spikes	Base per 100 lb.
Screw spikes	3.00
Tie plates, steel	2.15
Tie plates, pacific Coast	2.30
Track bolts	4.75
Track bolts, heat treated, to rail-roads	5.00
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) Per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100
lb. on field grade to and including
dynamo. Pacific ports add 75c. per 100
lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago,
Cleveland, Birmingham

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barless wire	70

*15% gage and heavier. †On 80-rod
spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District
and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/4 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/4 in.	25	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
1/4 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/4 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

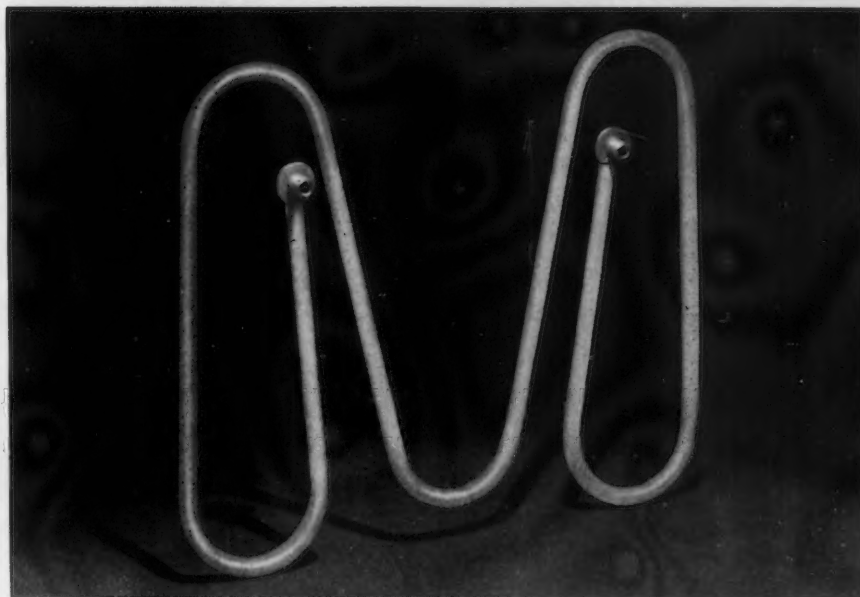
Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

Wrought Iron (Same as Above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe
jobbers are granted a discount of 5%. On
less-than-carload shipments prices are
determined by adding 25 and 30% and
the carload freight rate to the base card.
F.o.b. Gary prices are two points lower
discount or \$4 a ton higher than Pitts-
burgh or Lorain on lap weld and one
point lower discount, or \$2 a ton higher
on all butt weld.



Anything like this IN YOUR PLANT?

This odd-looking thing is a specially fabricated tubular part used in steriliz-
ing equipment for Army field hospitals.

It is made of seamless copper tube, 5/8" in diameter and has a wall thickness
of .035". After the part is formed to the desired shape (specified by the
customer), special cast bronze fittings are brazed to both ends. Then the
entire piece is electro-tin-plated.

Required for a definite purpose, it was designed by the user in collabo-
ration with Wolverine tube-fabricating engineers. All specifications are
being met and the job is in production.

If this piece reminds you of a similar problem of yours involving tube
or tubular parts, call Wolverine Tube Division for consultation and quota-
tion. We have hundreds of standard tools already on hand for making
parts and assemblies similar to the part shown here, along with a wealth
of experience in handling seamless tube.

Or if you prefer to make the part your-
self, call on Wolverine anyway as a
source for tube that will be uniformly
high in quality and possess the right
properties for fabricating. Also consult
our engineers regarding types of tools,
methods, and techniques. Their talents
and services are yours for no cost.

• Our new address is Detroit 9, Mich.

DEFINITIONS

Extrusion Block—a cylindri-
cal piece of cast metal—
copper or brass—which has
been cut from
the original
billet and pre-
pared for ex-
truding into
seamless tube.



BUY WAR BONDS



CALUMET AND HECLA CONSOLIDATED COPPER COMPANY
WOLVERINE TUBE DIVISION

Seamless Copper—Brass

1441 CENTRAL AVENUE

DETROIT, MICHIGAN

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.00	\$24.50	\$26.00	\$26.50		
Brooklyn	27.50			28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34	\$30.74	
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.		24.50			29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati, Ohio	23.94	23.94		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	
St. Louis	24.50	24.50				
Chicago	24.00	23.50	24.50	24.00	35.46	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	22.42	
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00	22.42	
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fo.						\$28.00
Lytle, Tenn. fc.†						33.00
St. Paul	26.76		27.26	26.76	39.80	
Duluth	24.50	24.00	25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	26.95					
San Francisco	26.95					
Seattle	26.95					
Provo, Utah	22.00	21.50				
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace\$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$23.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge \$30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21½ to 23¼c.
Copper, reduced, 150 and 200 mesh	20½ to 25¼c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer.	4c.
Iron, hydrogen reduced, 300 mesh and finer	63c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh.	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh, 11½ to 12½c.	
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51¼c.
Solder powder, 100 mesh, 8¼c. plus metal	
Tin, 100 mesh	58¼c.

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Cold Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04
2½ in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50
3½ in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54

(Extras for less carload quantities)

40,000 lb. or ft. and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

For convenience and efficiency in buying
...GET BOTH FROM
THE SAME SOURCE

Cleveland Cap Screws

SAE 1035 Heat Treated—for maximum tensile strength with good appearance.

Full Finished—for bright full finish with adequate tensile strength.

All made by the famous Kaufman Process; stocked in all standard sizes. Write for samples and prices.

Convenient warehouse stocks.

THE CLEVELAND CAP SCREW CO.

2917 EAST 79th STREET • CLEVELAND, OHIO

Cleveland Cap Screws

Set Screws and Special Upset Parts

Made by the Originators of the Kaufman Process for Greater Strength and Accuracy
Specialists for 26 years in Headed and Threaded Products

WAREHOUSES
CHICAGO: 726 W. Washington Blvd.
PHILADELPHIA: 12th & Olive Sts.
NEW YORK: 47 Murray St.
LOS ANGELES: 1015 E. 16th St.

PRICES

CAST IRON WATER PIPE

	Per Net Ton
4-in. and larger, del'd Chicago.....	\$54.80
4-in. and larger, del'd New York....	52.20
4-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle. 71.20	
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorous, 51.50	4.35

*Adjustments are made to indicated prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

COKE

	Per Net Ton
Furnace	
Connellsville, prompt	\$6.50*

	Per Net Ton
Foundry	
Connellsville, prompt	\$7.50
Fayette County, W. Va. (Beehive) ..	\$8.10
By-product, Chicago	\$12.25
By-product, New England	\$13.75
By-product, Newark	\$12.40 to \$12.95
By-product, Philadelphia	\$12.38
By-product, Cleveland	\$12.30
By-product, Cincinnati	\$11.75
By-product, Birmingham	\$8.60†
By-product, St. Louis	\$12.02
By-product, Buffalo	\$12.50

*Hand-drawn ovens using trucked coal are permitted to charge \$7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	\$33.00
Domestic, f.o.b. Ohio River landing barges	33.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	33.00

REFRACTORIES

(F.o.b. Works)

	Per 1000
Fire Clay Brick	
Super-duty brick, St. Louis	\$64.60
First quality, Pa., Md., Ky., Mo., Ill. 51.30	
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 46.55	
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

	Per 1000
Silica Brick	
Pennsylvania & Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern) ..	9.00

	Per Net Ton
Chrome Brick	
Standard, chemically bonded, Balt. Plymouth Meeting, Chester	\$54.00

	Per Net Ton
Magnesite Brick	
Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

	Per Net Ton
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

FERROALLOYS

	Per Net Ton
Ferromanganese	
78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale or Rockwood, Tenn. Carload lots (bulk)	\$135.00
Ton lots (packed)	141.00
Less ton lots (packed)	148.50
Premium, \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78% ..	



IMMERSED TYPES • PIPE CONNECTED • FLANGE MOUNTED

Cutting tools—like humans—sometimes get hot and bothered. But there is a simple remedy for the tools. Use Ruthman Gusher Coolant Pumps, and the tools will get all the coolant they want when they want it—instantly.

And your maintenance men will keep cooler, too, because upkeep is less with Ruthman Pumps. That's why you will see Ruthman Pumps on machine tools wherever you go.

THE RUTHMAN MACHINERY COMPANY • CINCINNATI, O.

RUTHMAN Coolant Pumps



No. 100 Decimal Timer

Graduated in decimal hundredths of a minute; sweep hand making complete revolution in one minute; total registration 30 minutes; "start-stop-and-fly-back" operation.



No. 105 Fifth Second Timer

Graduated in seconds and fifth seconds; sweep hand making complete revolution in one minute; total registration 30 minutes; "start-stop-and-fly-back" operation.

STOP WATCHES Available for Delivery

These instruments, produced in one of America's finest plants, contain a high precision, continuous running movement of seven jewels, encased in nickel.

We maintain a complete shop with skilled technicians for quick repairs on all types of stop watches, chronographs and other technical instruments.

M. J. STILLMAN CO., INC.

116 South Michigan Avenue

Chicago, Illinois



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.



HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

FAST, CONTINUOUS BLAST CLEANING!

DIRECT PRESSURE CABINET—Recommended for blast cleaning castings, forgings, heat-treated parts or wherever quick action is a necessity. Abrasive elevator system delivers cleaned abrasive to nozzle automatically. Cabinet size shown is 72" x 36". Other sizes available, including one with 60" rotary table. Write for bulletin 32-A.

Also manufacturers of Welding Fume Collectors, Abrasive Handling Systems, Cloth Dust Filters, Blast Rooms, and accessories.

**RUEMELIN MFG. C., 3870 N. Palmer St.
Milwaukee, Wisconsin**

RUEMELIN BLAST CABINETS

FERROALLOY

Electrolytic Manganese

99.9% manganese, maximum base contract price per lb. of metal, bulk, f.o.b. shipping point, with freight allowed to destination. Size, 1" x D.

	Eastern Zone	Central Zone	Western Zone
Carload lots	37.60c.	37.85c.	38.15c.
l.c.l. lots	39.60c.	38.60c.	40.65c.

Spiegeleisen

Maximum base contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
16-19% Mn 19-21% Mn 26-28% Mn
1% max. Si 1% max. Si 1% max. Si

	Eastern Zone	Central Zone	Western Zone
Carloads (p'ked)	\$41.00	\$42.00	\$55.50
Less ton lots	47.50	48.50	62.00

Electric Ferrosilicon

OPA maximum base price cents per lb. Si contained, lump size, f.o.b. shipping point with freight allowed to destination. Roman type indicates bulk car lots, italics l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
50% silicon	6.65c.	7.10c.	7.25c.
	7.85c.	9.70c.	8.75c.
75% silicon	8.05c.	8.20c.	8.75c.
	9.05c.	9.65c.	13.10c.

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)
F.o.b. Jackson, Ohio \$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size, f.o.b. shipping point, with freight allowed to destination.

Roman type are carload prices in bulk; italics are l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon	25.00c.	25.40c.	26.00c.
	26.00c.	26.65c.	27.45c.
0.06% carbon	23.00c.	23.40c.	24.00c.
	24.00c.	24.65c.	25.85c.
0.10% carbon	22.50c.	22.90c.	23.50c.
	23.50c.	24.15c.	25.35c.
1.00% carbon	20.50c.	20.90c.	21.50c.
	21.50c.	22.15c.	23.35c.
2.00% carbon	19.50c.	19.90c.	20.50c.
	20.50c.	21.15c.	22.35c.

Spot prices are 1/4c. higher per lb. contained Cr. For extras and premiums see MPR 407.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car Lots	3.35c.	3.50c.	3.65c.

Spot prices 1/4c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(Per gross ton, delivered, carloads, bulk)
3.00 carbon \$120.00*
2.50 carbon 125.00*
2.00 carbon 130.00*
1.00 carbon 140.00*

Briquets, contract, basis carlots, bulk freight allowed, per lb. 5.80c.†
Packed 6.05c.†
Less-ton lots 6.55c.†

*Spot prices are \$5 per ton higher.
†Spot prices 1/4c. higher.

PRICES

Other Ferroalloys

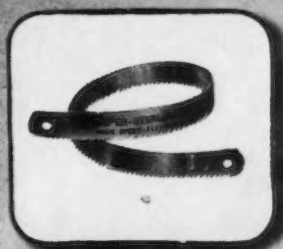
Ferrotungsten, delivered, carlots, per lb. contained tungsten . . .	\$1.90
Tungsten metal powder, 98%-99%, any quantity, per lb. . . .	\$2.60
Ferrovandium, 35%-40%, contract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. contained vanadium	\$2.70
Special grade	\$2.80
Very special grade	\$2.90
Vanadium pentoxide, 88%-92% V ₂ O ₅ technical grade, contract basis, any quantity, per lb. contained V ₂ O ₅	\$1.10
Ferrobrom, contract basis, 17.50 % boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy Ton lots	\$1.20 \$1.25
Silicaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per pound contained boron . . .	\$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium . .	\$2.25
Less-ton lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium . . .	\$1.23
Less-ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less-ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore & St. Louis, per gross ton.	\$142.50
3%-5% carbon	\$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala. carlots, with \$3 unitage freight equaled with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. Under 100 lb.	\$2.60 \$3.00
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Less-ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton.	\$102.50
Packed	\$107.50
Less-ton lots	\$112.50
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb. . .	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots, freight allowed, per lb.	10.50c.
Less-ton lots	11c.

Super-Sterling Saws

HACK SAW BLADES

BROACH SAW BLADES

METAL - CUTTING BAND SAW BLADES



Super-Sterling Flexible

Industry prefers the serviceability of high speed steel in hand hack saw blades. The purchase price is higher but the utility of the blades makes them economical provided—

Premature breakage can be avoided!

The SUPER - STERLING Flexible meets the challenge. It's the High Speed Steel hand blade that *won't break* in use. It's *guaranteed* shatter-proof.

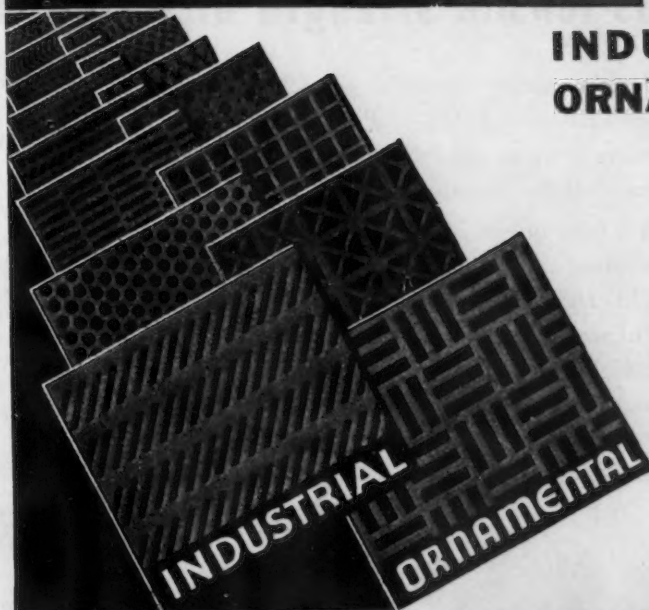
Specify Super-Sterling. Your Mill Supply Distributor will be glad to demonstrate it for you—or write Dept. A.

They don't scratch, they cut!

DIAMOND SAW WORKS, Inc.
BUFFALO, NEW YORK

PERFORATED METALS

INDUSTRIAL ORNAMENTAL



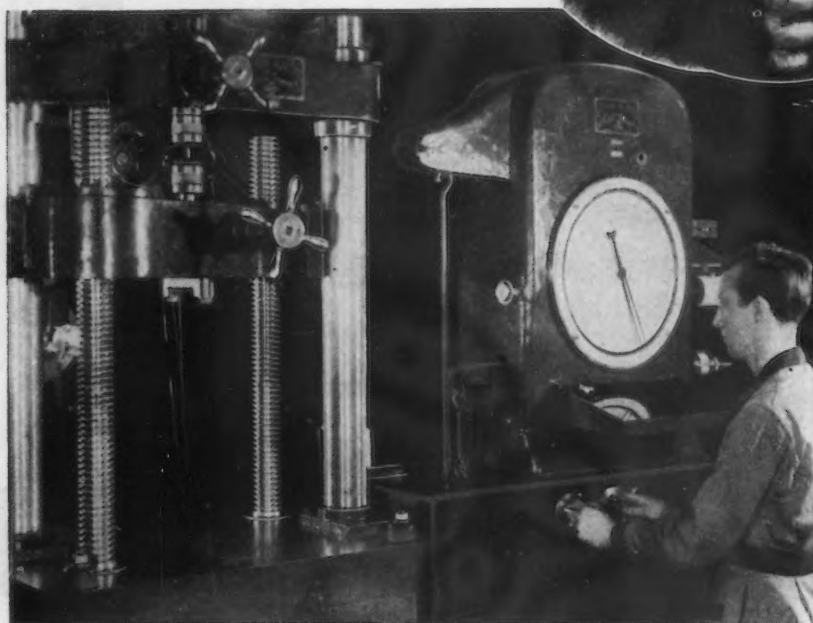
ANY METAL ANY PERFORATION

The Harrington & King Co.
PERFORATING

5657 FILLMORE STREET—CHICAGO 44, ILL.
New York 6, Office, 114 Liberty Street

GARGANTUA

is a sissy...



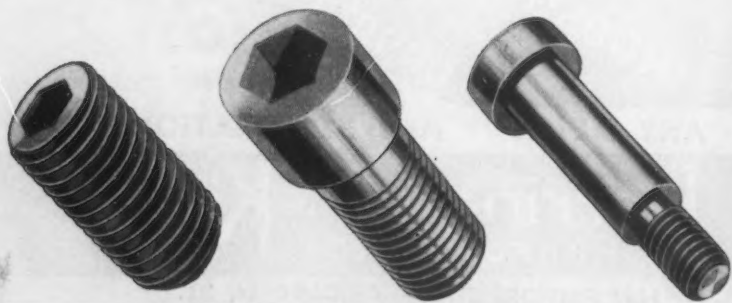
... compared to the mechanical brute that proves the surplus tensile strength of Parker-Kalon Socket Screws

This 100,000 pound capacity Olsen Universal Tester in the P-K Laboratory checks every batch of Parker-Kalon Cold-forged Socket Screws to make sure that they meet the high Parker-Kalon standards for Tensile Strength.

The tensile test is only one of 16 check-ups that are made to assure the unfailing performance of P-K Cold-forged Socket Screws. This rigid routine of *quality control* eliminates the "doubtful screws" — screws that *look* all right, but may fail to *work* right. Socket Screw users need this protection today more than ever. Specify Parker-Kalon next time you order . . . it costs no more. Parker-Kalon Corp. 200-202 Varick Street, New York, N. Y.

This 16-point "Quality-Control" protects P-K Socket Screw Users

1—Chemical Analysis. 2—Tensile Strength. 3—Ductility. 4—Torsional Strength. 5—Ability to take Shock Loads under Tension. 6—Resistance to Shock Loads under Shear. 7—Hardness. In addition, there is a rigid inspection of these essentials: 8—Head Diameter. 9—Head Height. 10—Concentricity of Head to Body. 11—Socket Shape. 12—Socket Size. 13—Socket Depth. 14—Centricity of Socket. 15—Class 3 Fit Threads. 16—Clean Starting Threads.



PARKER-KALON
Quality-Controlled
SOCKET SCREWS